STRONG

Service Manual
(SRT4402)

STRONG

Contents

1. Technical specifications

1.1. Conditional Access Interface

SMART CARD	2 Slot ISO 7816, GSM11.11 and EMV (payment systems) compatibility

1.2 Tuner & Channel

Input Connector	F-type, IEC169-24, Female
Frequency Range	950MHz to 2150MHz
Input Impedance	75Ω unbalanced
Signal Level	-25 to –65dBm
IF frequency	480MHz
IF Bandwidth	55MHz
LNB Power	Vertical : +13V Horizontal : +18V Current : Max, 500mA
Polarization	13V/18V
22KHz Tone	Frequency:22?4kHz Amplitude : 0.6?0.2V
DiSEqC Control	Version 1.2 compatible
Demodulation	QPSK
Input Symbol Rate	2-31Ms/s
FEC Decoder	Convolution Code Rate 1/2, 2/3, 3/4, 5/6, 7/8 with constraint length K=7

1.3 System & Memory

Main processor	SC2005(LSI-LOGIC)
Flash memory	1Mbyte
Processor SDRAM	8Mbyte
A/V decoder SDRAM	4Mbyte
EEPROM	8Kbyte
Channel Memory	3500 Digital channels
Multi-Satellite	Up to 64

1.4 MPEG Transport Stream & A/V Decoding

Transport Stream	MPEG-2 ISO/IEC 13818 Transport Stream Specification
Profile Level	MPEG-2 MP@ML
Input Rate	Max. 90Mbits/s
Aspect ratio	4:3, 16:9
Frame Rate	25Hz for PAL, 30Hz for NTSL
Teletext	Through VBI

Audio decoding	MPEG/MUSICAM Layer I & II
Audio mode	Single channel/Dual channel Joint stereo/Stereo
Frequency Response	20~20kHz, <?2dB 60Hz~18kHz <?0.5dB
Sampling rate	32, 44.1, 48kHz

1.5 Front panel

Display	4-digit 7-segment Display
Function keys	Power, Left/Right, Up/Down, Menu/Exit

1.6 A/V & Data In / Out

TV Scart Output	RGB, CVBS, L, R Output with volume control
VCR Scart output	CVBS, L, R Input, CVBS, L, R Output : Option
RCA Output	CVBS,L,R Output with Volume Control
Data Interface	RS-232, Bit Rate: 115,200band Connector: 9-pin D-sub type

1.7 Power Supply

Input Voltage	AC90 to 240VAC, 50Hz/60Hz
Type	PWM Regulator
Power Consumption	Max.30W
Protection	Separate Internal Fuse The input shall have the lighting protection.

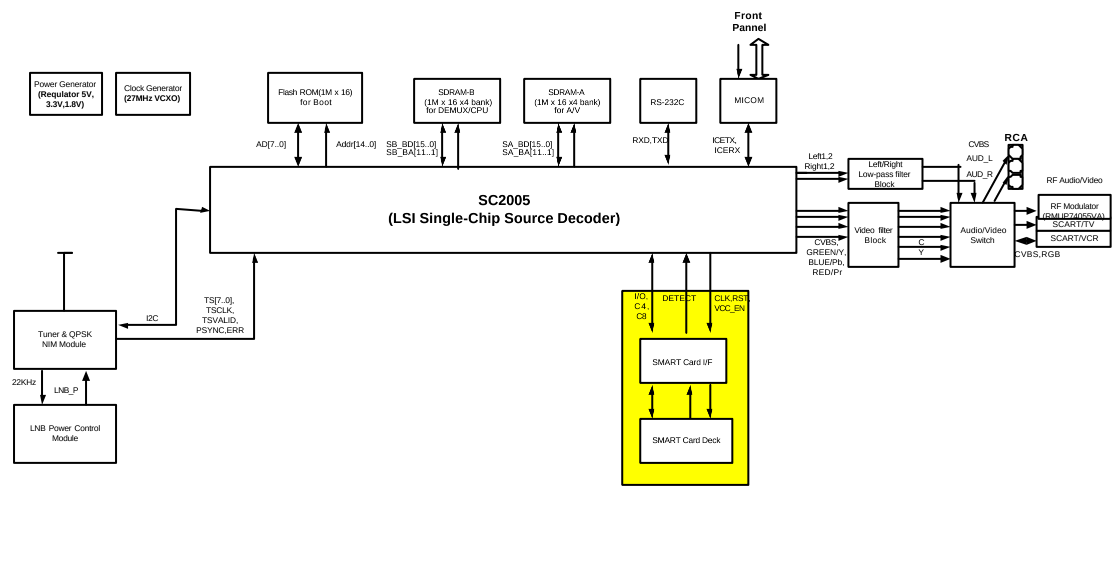
1.8 Physical Specification

Size (WxHxD)	280x55x235mm Excluding the foot. Foot height is 10mm.
Weight	2.0Kg

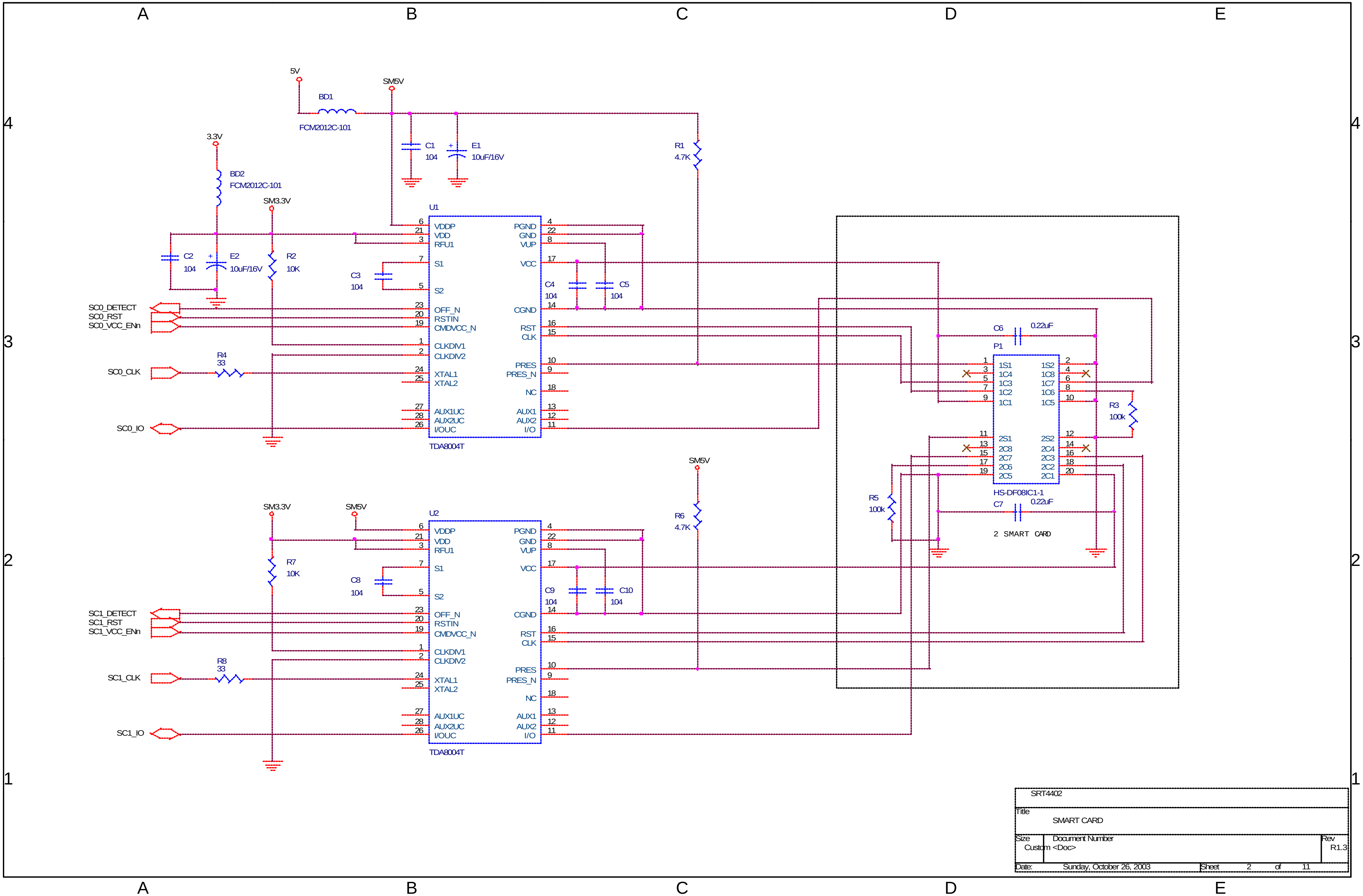
1.9 Environmental Condition

Operating Temperature	0~40C
Storage Temperature	-10C~+50C
Operating Humidity Range	10~85% RH, Non-condensing
Storage Humidity Range	5~90% RH, Non-condensing

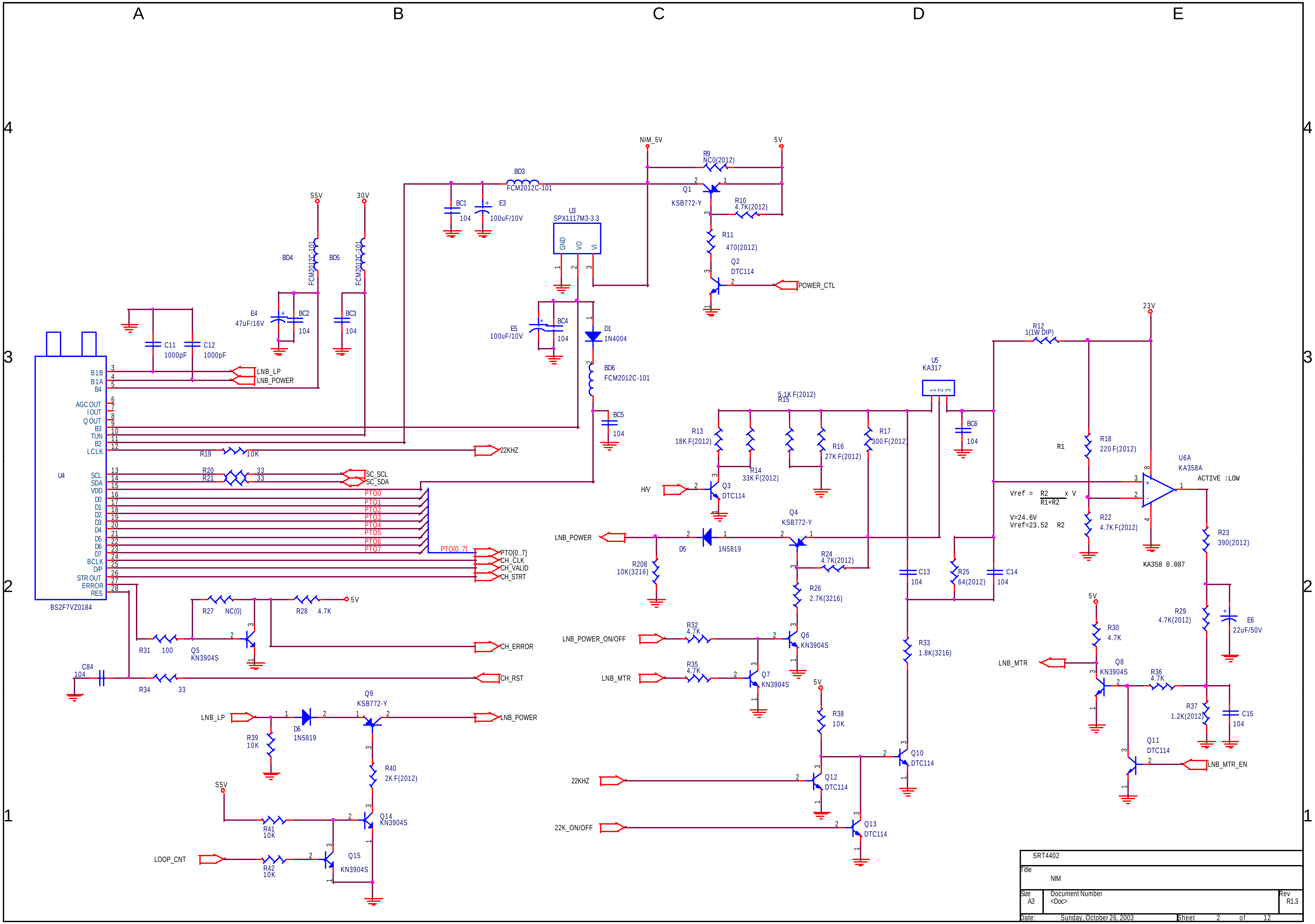
2. Block Diagram



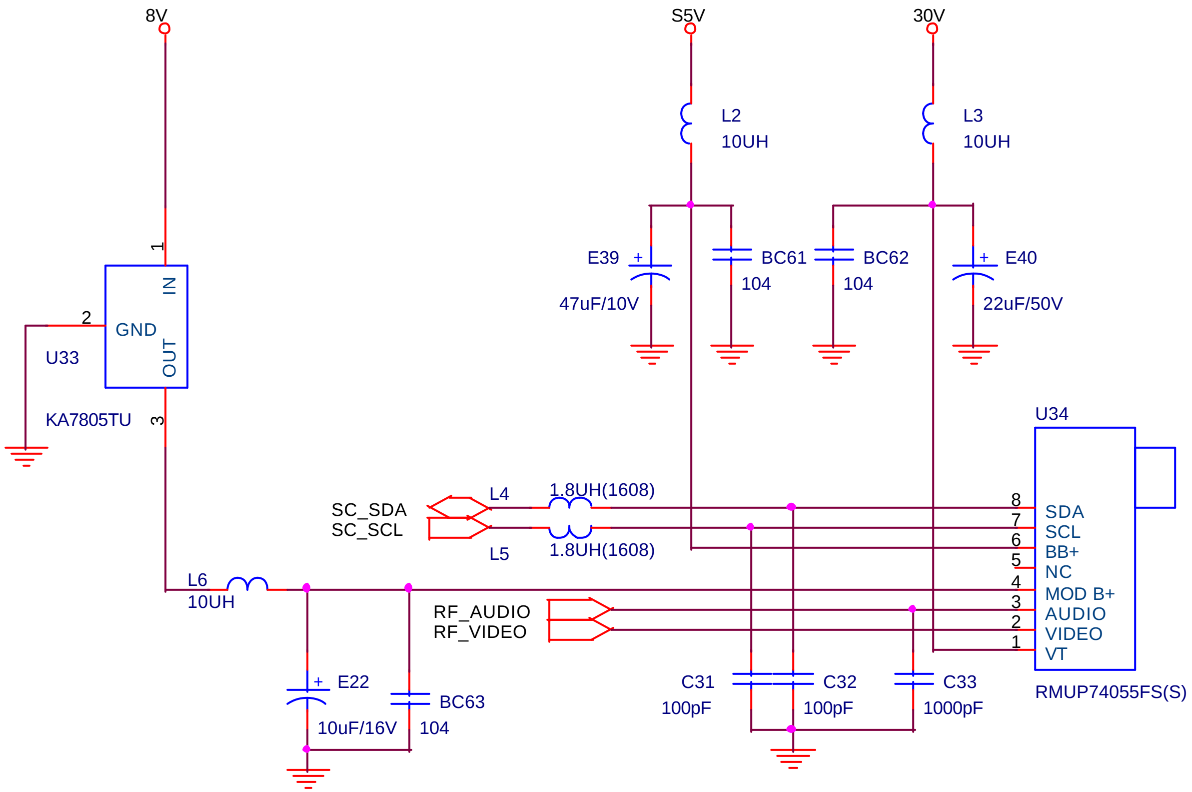
SRT4402 Block Diagram



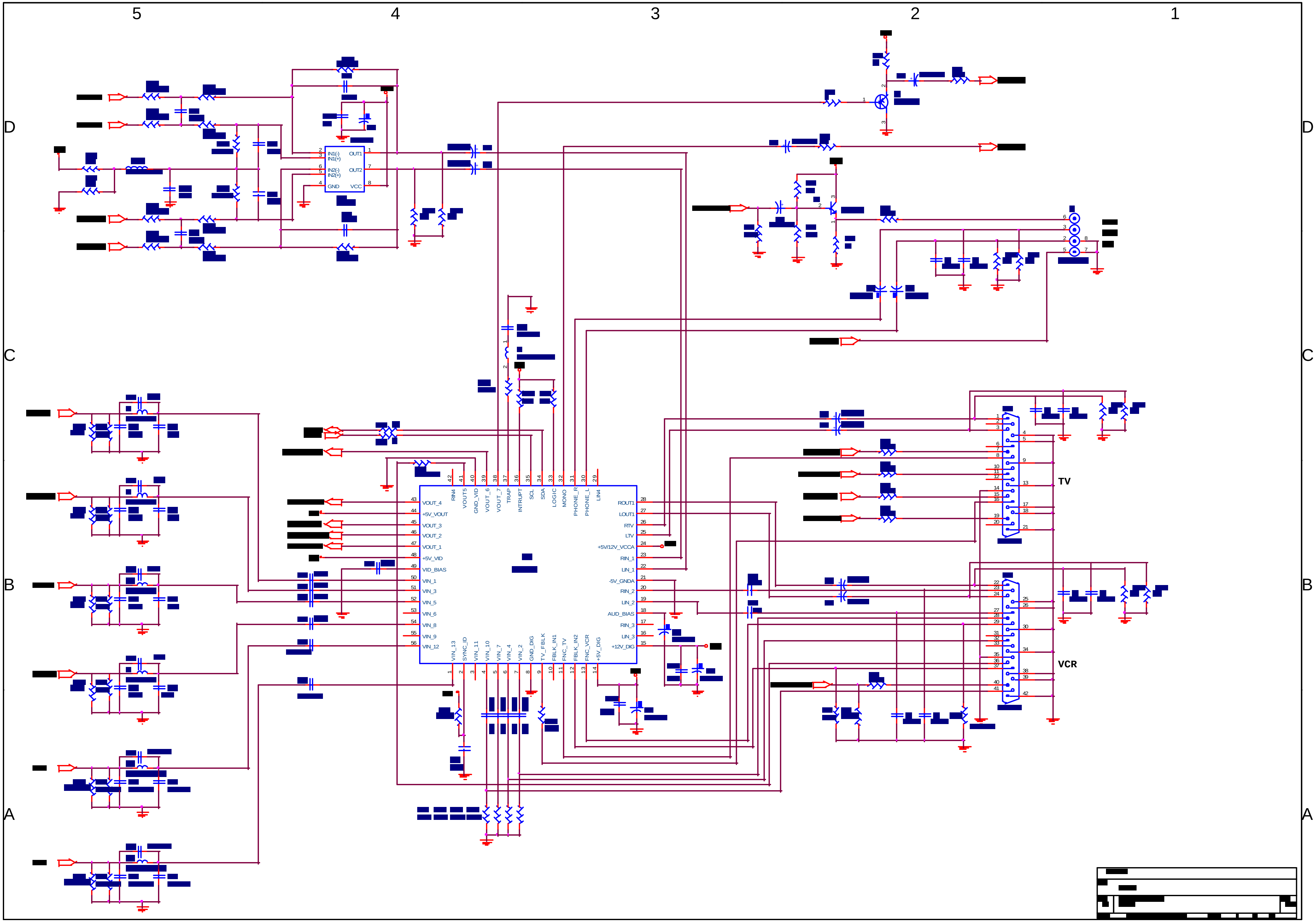
A B C D E
4 3 2 1
5V
SM5V
BD1
FCM2012C-101
C1 104
E1 10uF/16V
R1 4.7K
3.3V
BD2
FCM2012C-101
SM3.3V
C2 104
E2 10uF/16V
R2 10K
C3 104
U1
VDDP VDD RFU1 S1 S2 OFF_N RSTIN CMDVCC_N CLKDIV1 CLKDIV2 XTAL1 XTAL2 AUX1UC AUX2UC I/OUC
PGND GND VUP VCC CGND RST CLK PRES PRES_N NC AUX1 AUX2 I/O
TDA8004T
C4 104
C5 104
SC0_DETECT
SC0_RST
SC0_VCC_ENn
R4 33
SC0_CLK
SC0_IO
C6 0.22uF
P1
1S1 1C4 1C3 1C2 1C1 1S2 1C8 1C7 1C6 1C5
2S1 2C8 2C7 2C6 2C5 2S2 2C4 2C3 2C2 2C1
R3 100k
HS-DF08IC1-1
R5 100k
C7 0.22uF
2 SMART CARD
SM5V
R6 4.7K
SM3.3V
SM5V
U2
R7 10K
C8 104
C9 104
C10 104
SC1_DETECT
SC1_RST
SC1_VCC_ENn
R8 33
SC1_CLK
SC1_IO
TDA8004T
SRT4402
Title
SMART CARD
Size Custom
Document Number <Doc>
Rev R1.3
Date: Sunday, October 26, 2003
Sheet 2 of 11

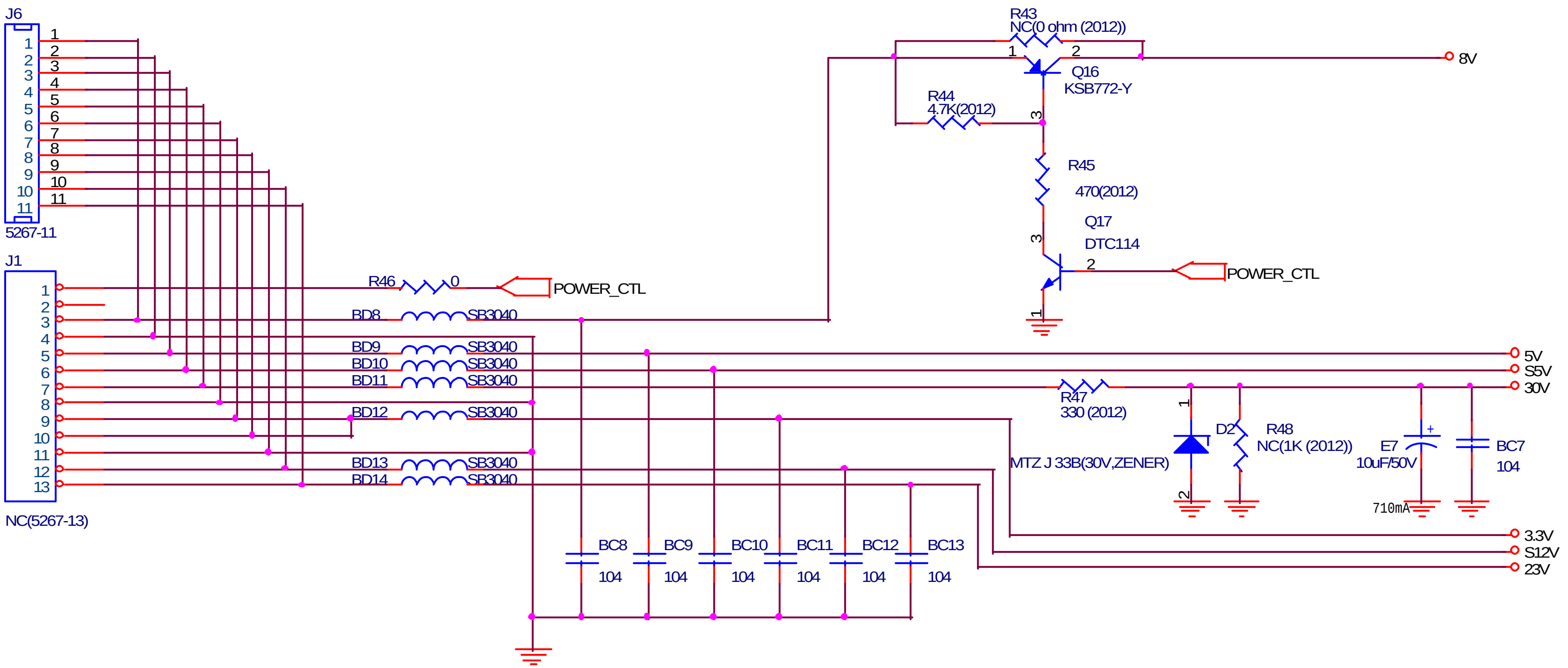


SRT4402		
Title: NIM		
Size: A3	Document Number: <Doc>	Rev: R1.3
Date: Sunday, October 26, 2003	Sheet 2 of 12	



SRT4402		
Title RF_MOD		
Size A	Document Number <Doc>	Rev R1.3
Date: Sunday, October 26, 2003	Sheet 2 of 11	


5
4
3
2
1
D
C
B
A
IN1(-)
IN1(+)
IN2(-)
IN2(+)
OUT1
OUT2
GND
VCC
VOUT_4
+5V_VOUT
VOUT_3
VOUT_2
VOUT_1
+5V_VID
VID_BIAS
VIN_1
VIN_3
VIN_5
VIN_6
VIN_8
VIN_9
VIN_12
RIN4
VOUT5
GND_VID
VOUT_6
VOUT_7
TRAP
INTRUPT
SCL
SDA
LOGIC
MONO
PHONE_R
PHONE_L
LIN4
ROUT1
LOUT1
RTV
LTV
+5V/12V_VCCA
RIN_1
LIN_1
-5V_GNDA
RIN_2
LIN_2
AUD_BIAS
RIN_3
LIN_3
+12V_DIG
VIN_13
SYNC_ID
VIN_11
VIN_10
VIN_7
VIN_4
VIN_2
GND_DIG
TV_FBLK
FBLK_IN1
FNC_TV
FBLK_IN2
FNC_VCR
+5V_DIG
TV
VCR

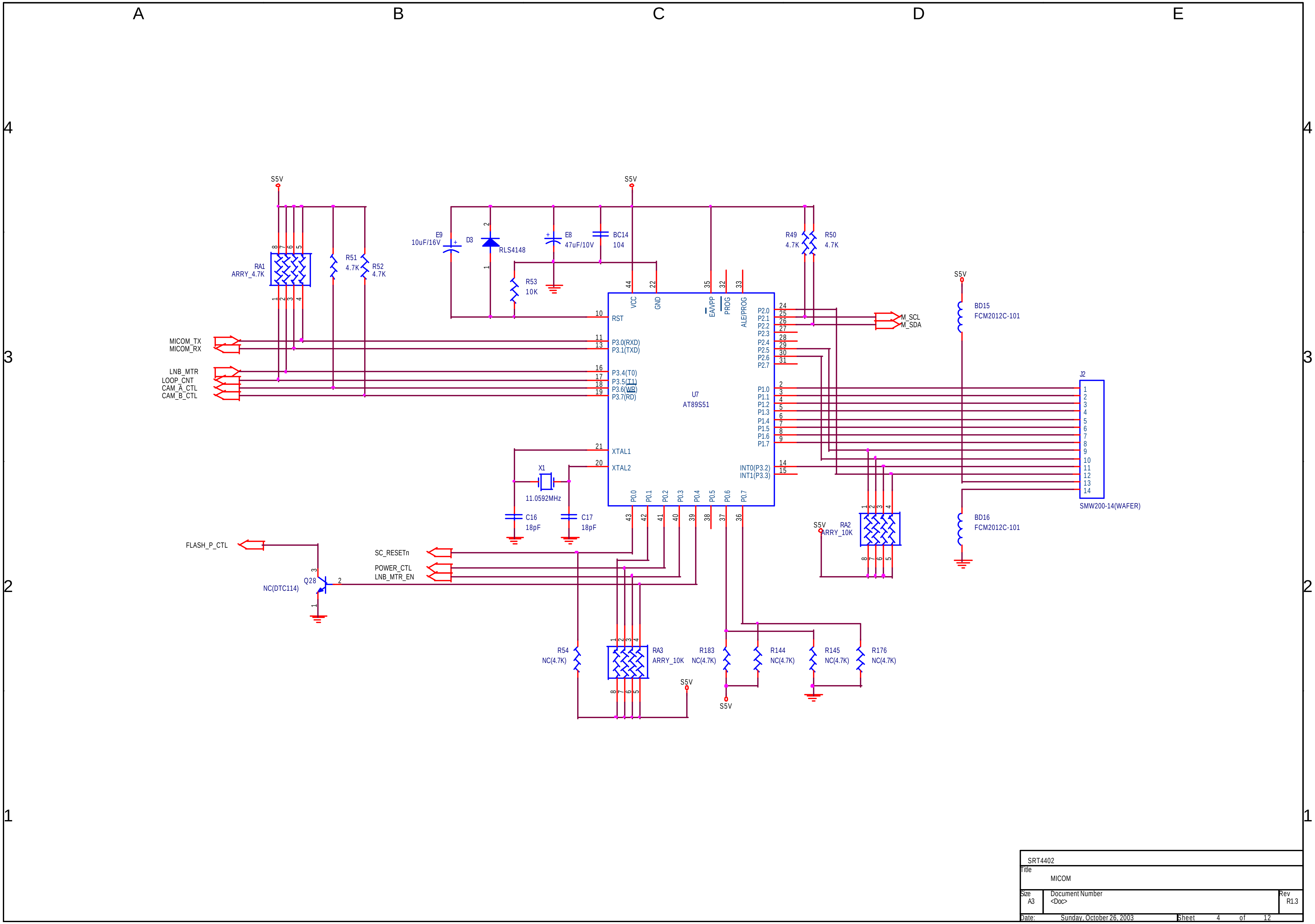


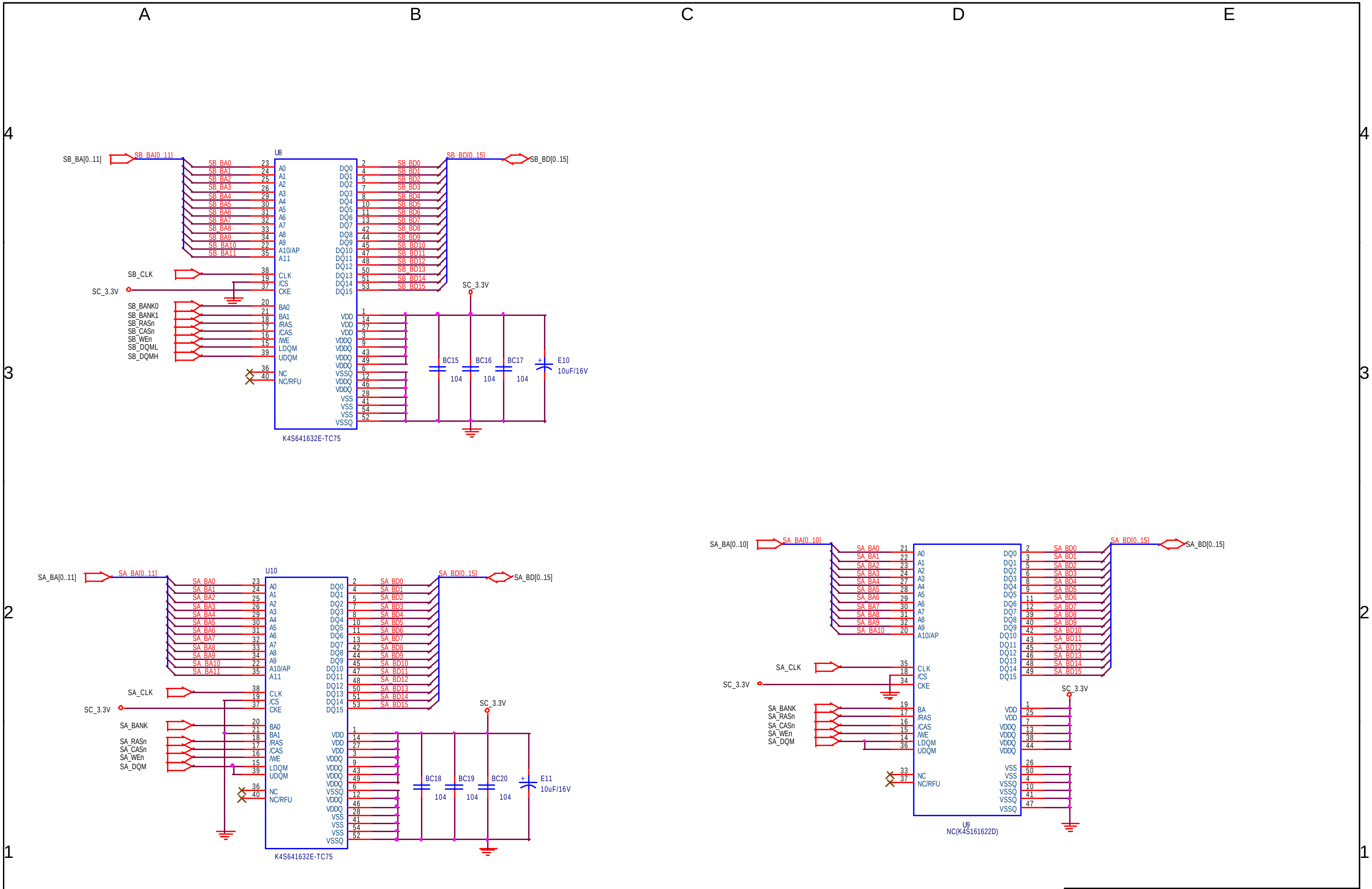
SRT4402

Title: POWER

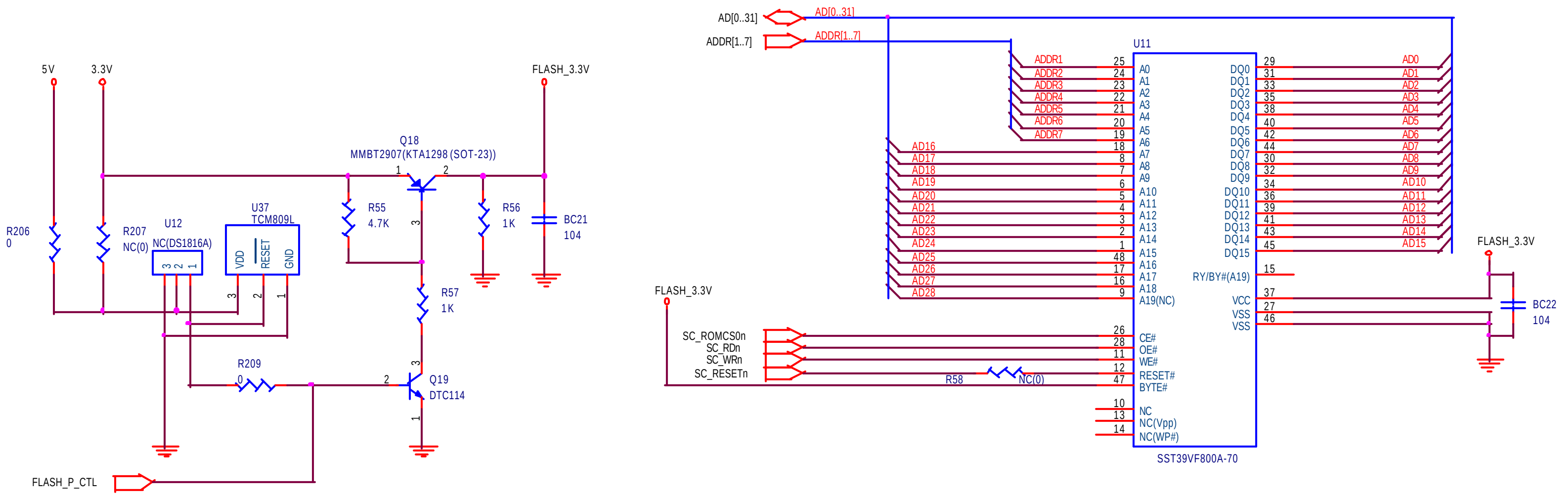
Size: A4 | Document Number: <Doc> | Rev: R1.3

Date: Sunday, October 26, 2003 | Sheet 3 of 12

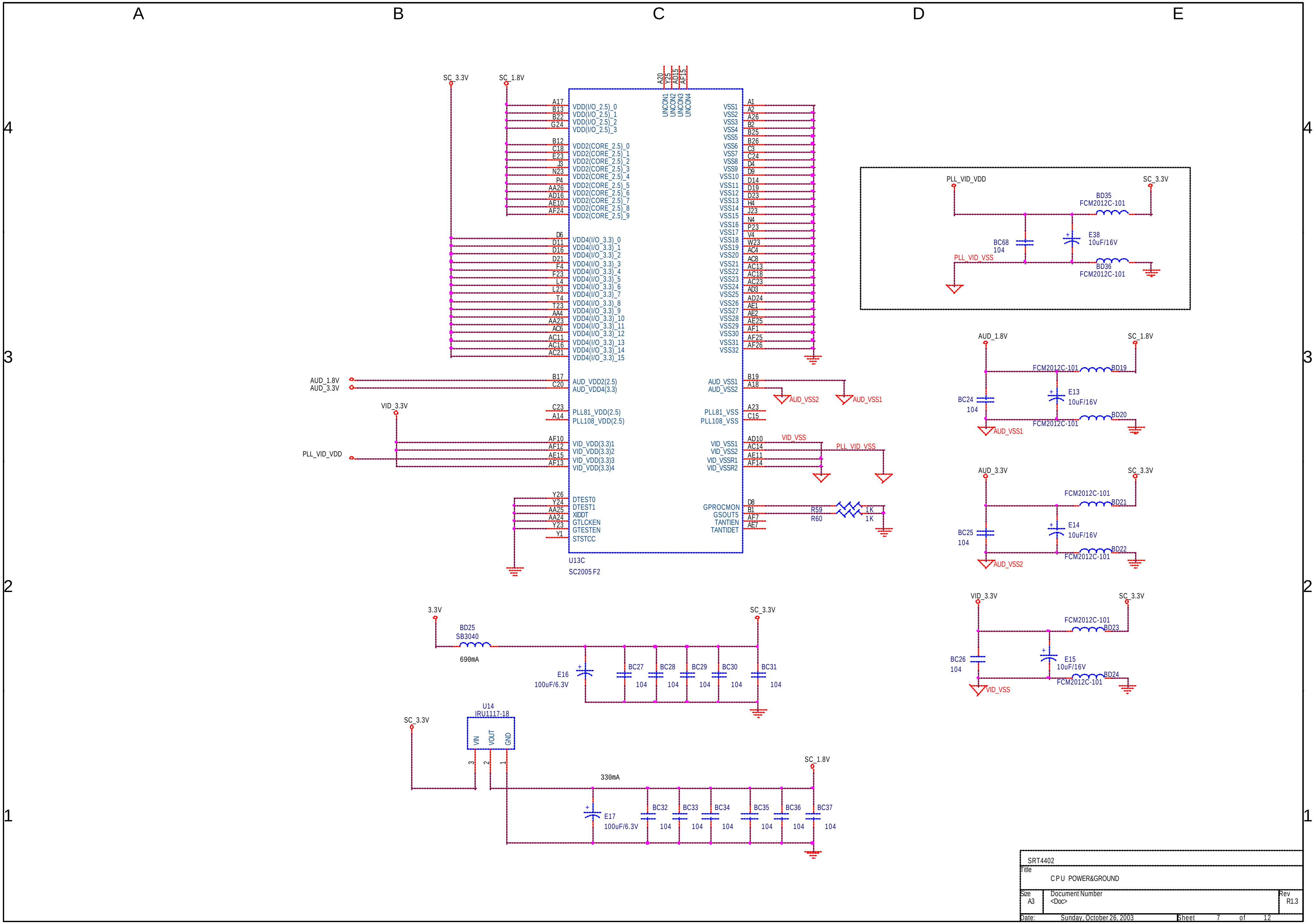

A
B
C
D
E
4
3
2
1
S5V
RA1
ARRY_4.7K
R51
4.7K
R52
4.7K
E9
10uF/16V
D3
RLS4148
R53
10K
E8
47uF/10V
BC14
104
R49
4.7K
R50
4.7K
BD15
FCM2012C-101
MICOM_TX
MICOM_RX
LNB_MTR
LOOP_CNT
CAM_A_CTL
CAM_B_CTL
VCC
GND
EA/VPP
PROG
ALE/PROG
RST
P3.0(RXD)
P3.1(TXD)
P3.4(T0)
P3.5(T1)
P3.6(WR)
P3.7(RD)
U7
AT89S51
P2.0
P2.1
P2.2
P2.3
P2.4
P2.5
P2.6
P2.7
M_SCL
M_SDA
P1.0
P1.1
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
J2
SMW200-14(WAFER)
XTAL1
XTAL2
INT0(P3.2)
INT1(P3.3)
P0.0
P0.1
P0.2
P0.3
P0.4
P0.5
P0.6
P0.7
X1
11.0592MHz
C16
18pF
C17
18pF
RA2
ARRY_10K
BD16
FCM2012C-101
FLASH_P_CTL
SC_RESETn
POWER_CTL
LNB_MTR_EN
Q28
NC(DTC114)
R54
NC(4.7K)
RA3
ARRY_10K
R183
NC(4.7K)
R144
NC(4.7K)
R145
NC(4.7K)
R176
NC(4.7K)
SRT4402
Title
MICOM
Size
A3
Document Number
<Doc>
Rev
R1.3
Date: Sunday, October 26, 2003
Sheet 4 of 12

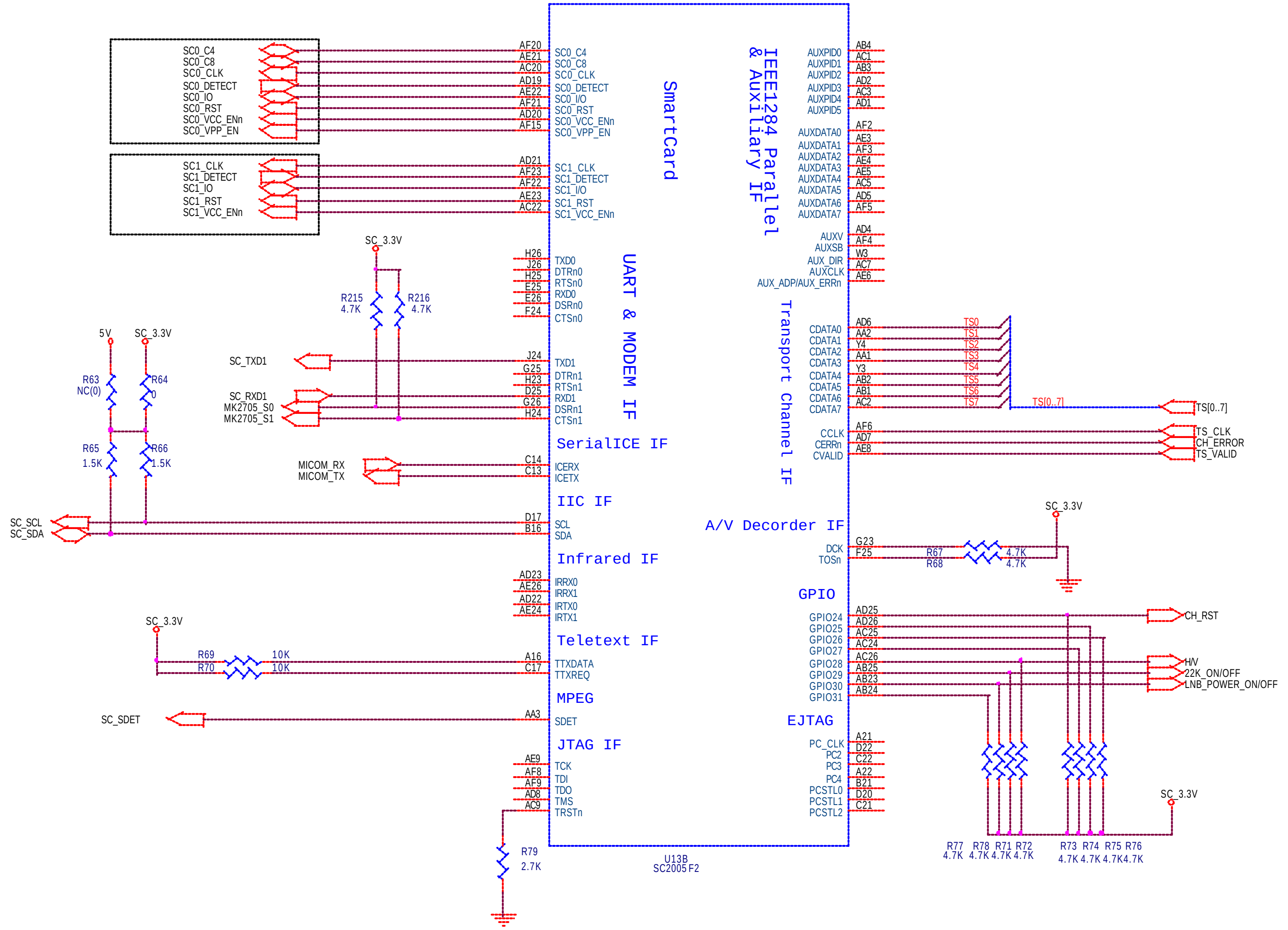


SRT4402	
Title	MEMORY
Size A3	Document Number <Doc>	Rev R1.3
Date: Sunday, October 26, 2003	Sheet 5 of 12



SRT4402	
Title	FLASH ROM
Size A3	Document Number <Doc> — Rev R1.3
Date: Sunday, October 26, 2003	Sheet 6 of 12


A B C D E
4 3 2 1
SC_3.3V
SC_1.8V
A20 Y25 AD15 AF15
UNCON1 UNCON2 UNCON3 UNCON4
VDD(I/O_2.5)_0
VDD(I/O_2.5)_1
VDD(I/O_2.5)_2
VDD(I/O_2.5)_3
VDD2(CORE_2.5)_0
VDD2(CORE_2.5)_1
VDD2(CORE_2.5)_2
VDD2(CORE_2.5)_3
VDD2(CORE_2.5)_4
VDD2(CORE_2.5)_5
VDD2(CORE_2.5)_6
VDD2(CORE_2.5)_7
VDD2(CORE_2.5)_8
VDD2(CORE_2.5)_9
VDD4(I/O_3.3)_0
VDD4(I/O_3.3)_1
VDD4(I/O_3.3)_2
VDD4(I/O_3.3)_3
VDD4(I/O_3.3)_4
VDD4(I/O_3.3)_5
VDD4(I/O_3.3)_6
VDD4(I/O_3.3)_7
VDD4(I/O_3.3)_8
VDD4(I/O_3.3)_9
VDD4(I/O_3.3)_10
VDD4(I/O_3.3)_11
VDD4(I/O_3.3)_12
VDD4(I/O_3.3)_13
VDD4(I/O_3.3)_14
VDD4(I/O_3.3)_15
VSS1 VSS2 VSS3 VSS4 VSS5 VSS6 VSS7 VSS8 VSS9 VSS10 VSS11 VSS12 VSS13 VSS14 VSS15 VSS16 VSS17 VSS18 VSS19 VSS20 VSS21 VSS22 VSS23 VSS24 VSS25 VSS26 VSS27 VSS28 VSS29 VSS30 VSS31 VSS32
AUD_1.8V
AUD_3.3V
AUD_VDD2(2.5)
AUD_VDD4(3.3)
AUD_VSS1
AUD_VSS2
VID_3.3V
PLL81_VDD(2.5)
PLL108_VDD(2.5)
PLL81_VSS
PLL108_VSS
PLL_VID_VDD
VID_VDD(3.3)1
VID_VDD(3.3)2
VID_VDD(3.3)3
VID_VDD(3.3)4
VID_VSS1
VID_VSS2
VID_VSSR1
VID_VSSR2
VID_VSS
PLL_VID_VSS
DTEST0
DTEST1
XIDDT
GTLCKEN
GTESTEN
STSTCC
GPROCMON
GSOUT5
TANTIEN
TANTIDET
R59
R60
1K
U13C
SC2005 F2
BD35
FCM2012C-101
BC68
104
E38
10uF/16V
BD36
BD19
BD20
BC24
E13
BD21
BD22
BC25
E14
BD23
BD24
BC26
E15
3.3V
BD25
SB3040
690mA
E16
100uF/6.3V
BC27 BC28 BC29 BC30 BC31
U14
IRU1117-18
VIN VOUT GND
330mA
E17
BC32 BC33 BC34 BC35 BC36 BC37
SRT4402
Title
CPU POWER&GROUND
Size
A3
Document Number
<Doc>
Rev
R1.3
Date: Sunday, October 26, 2003
Sheet 7 of 12

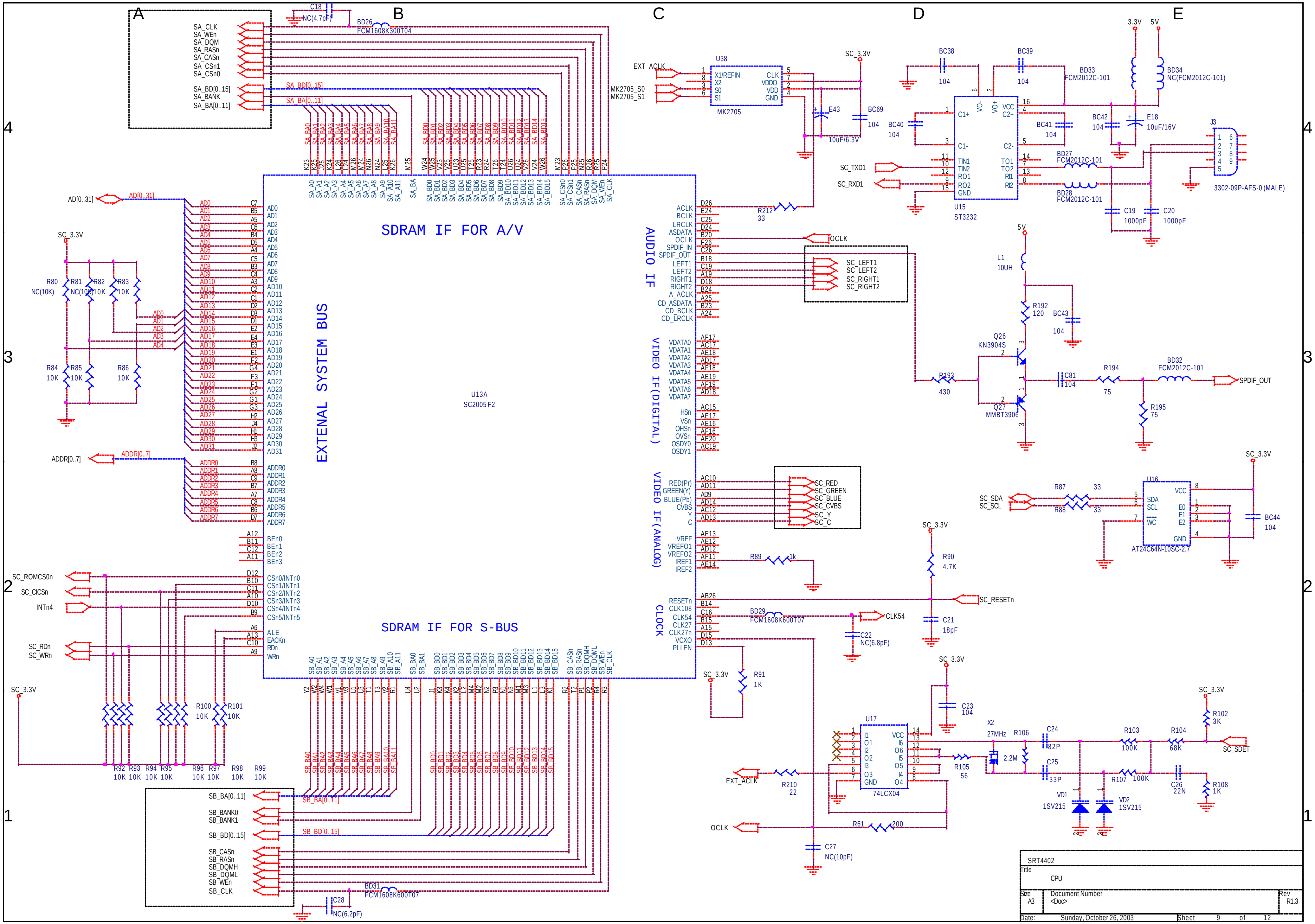


SRT4402

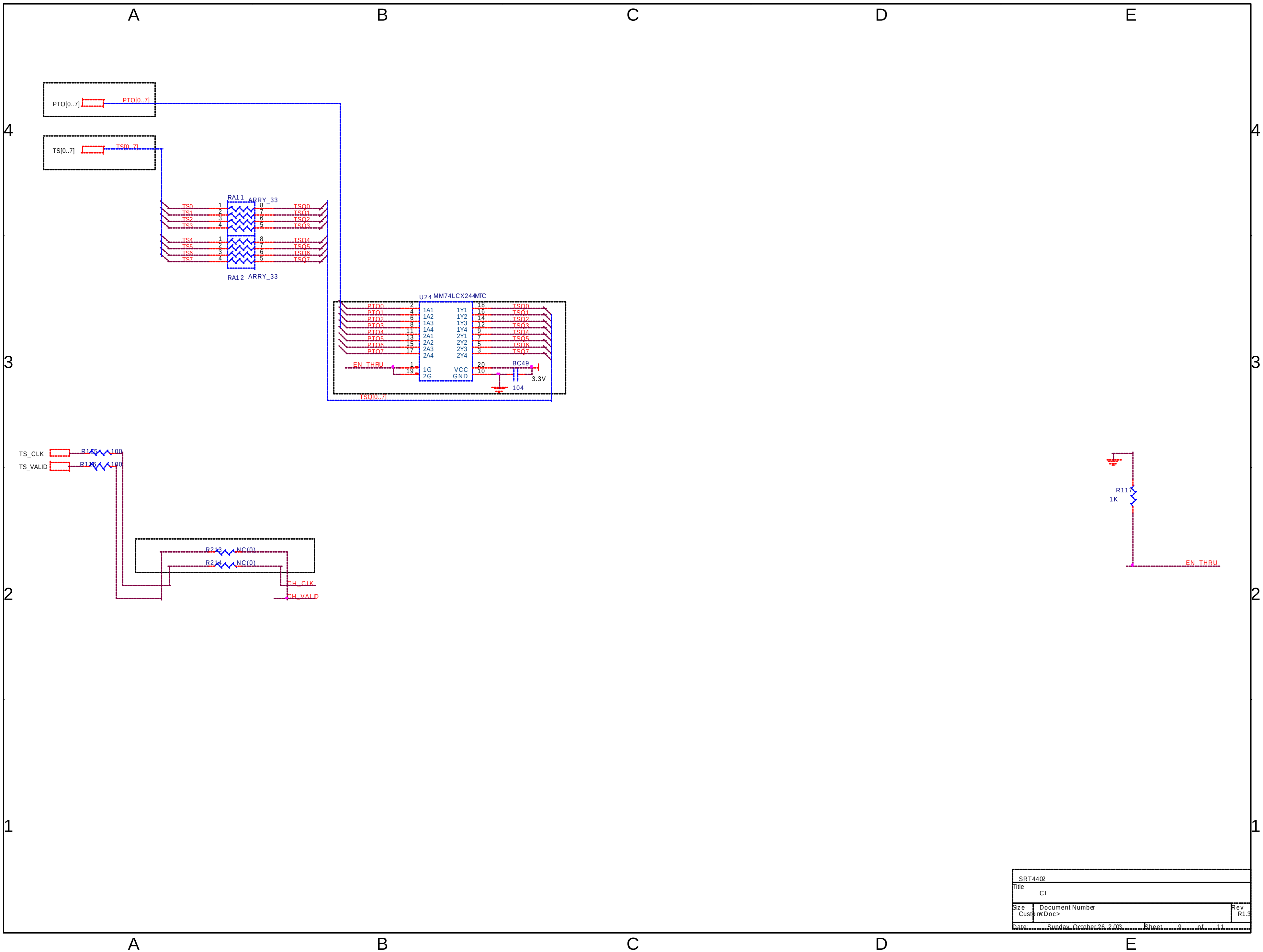
Title: CPU IO

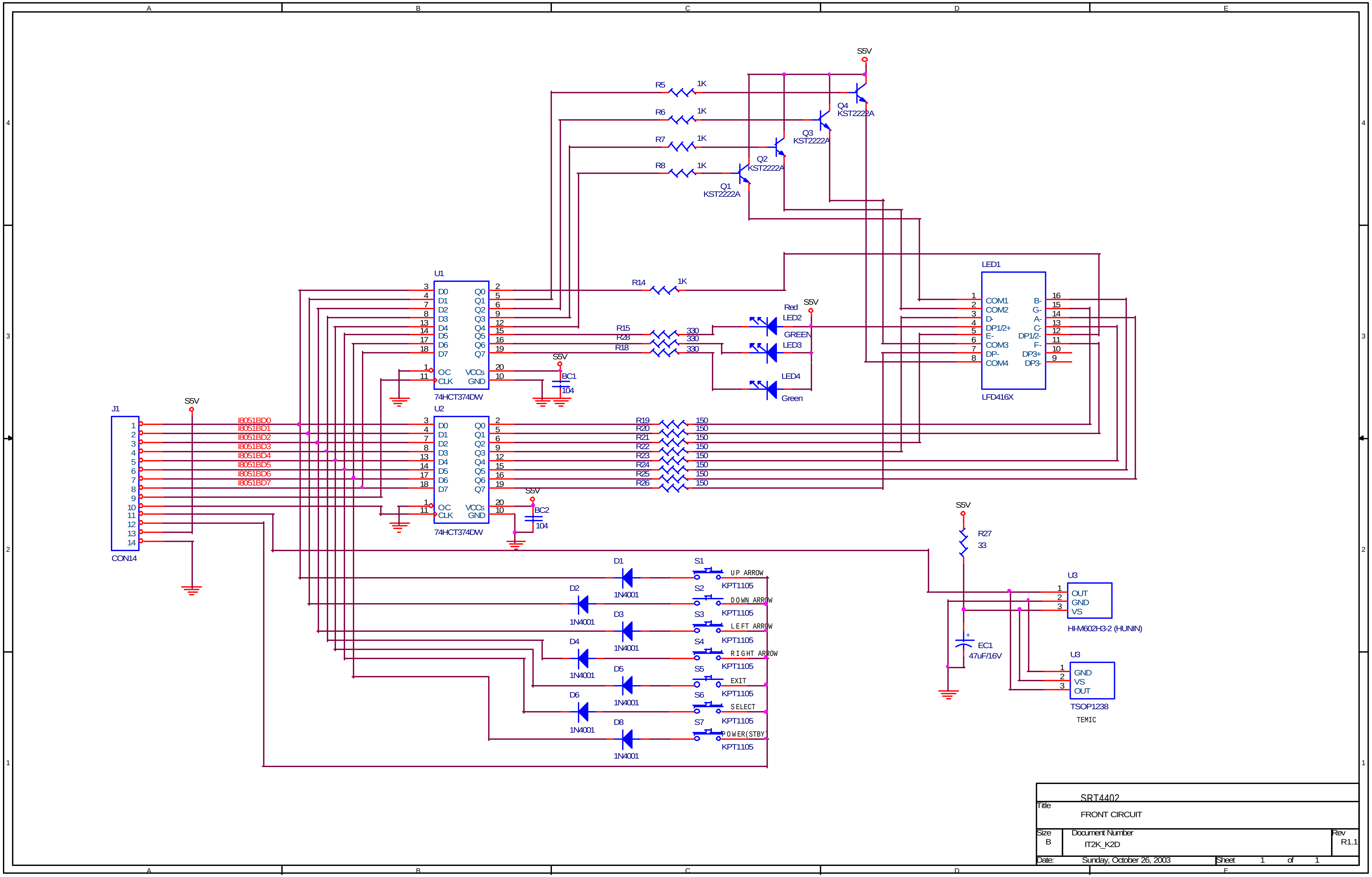
Size	Document Number	Rev
A3	<Doc>	R1.3

Date: Sunday, October 26, 2003 | Sheet 8 of 12



SDRAM IF FOR A/V
EXTENAL SYSTEM BUS
SDRAM IF FOR S-BUS
AUDIO IF
VIDEO IF(DIGITAL)
VIDEO IF(ANALOG)
CLOCK
U13A
SC2005F2
SA_CLK
SA_WEn
SA_DQM
SA_RASn
SA_CASn
SA_CSn1
SA_CSn0
SA_BD[0..15]
SA_BANK
SA_BA[0..11]
C18
NC(4.7pF)
BD26
FCM1608K300T04
AD[0..31]
ADDR[0..7]
SC_3.3V
R80 NC(10K)
R81 NC(10K)
R82 10K
R83 10K
R84 10K
R85 10K
R86 10K
SC_ROMCS0n
SC_CICSn
INTn4
SC_RDn
SC_WRn
R92 10K
R93 10K
R94 10K
R95 10K
R96 10K
R97 10K
R98 10K
R99 10K
R100 10K
R101 10K
SB_BA[0..11]
SB_BANK0
SB_BANK1
SB_BD[0..15]
SB_CASn
SB_RASn
SB_DQMH
SB_DQML
SB_WEn
SB_CLK
BD31
FCM1608K600T07
C28
NC(6.2pF)
EXT_ACLK
MK2705_S0
MK2705_S1
U38
MK2705
X1/REFIN
X2
S0
S1
CLK
VDDO
VDD
GND
E43
10uF/6.3V
BC69
104
R212
33
OCLK
SC_LEFT1
SC_LEFT2
SC_RIGHT1
SC_RIGHT2
SC_RED
SC_GREEN
SC_BLUE
SC_CVBS
SC_Y
SC_C
R89
1k
R90
4.7K
SC_RESETn
BD29
FCM1608K600T07
CLK54
C22
NC(6.8pF)
C21
18pF
R91
1K
BC38
104
BC39
104
BC40
104
BC41
104
BC42
104
U15
ST3232
C1+
C1-
C2+
C2-
VCC
VO-
VO+
TIN1
TIN2
RO1
RO2
GND
TO1
TO2
RI1
RI2
SC_TXD1
SC_RXD1
BD33
FCM2012C-101
BD34
NC(FCM2012C-101)
E18
10uF/16V
3.3V
5V
BD27
FCM2012C-101
BD28
FCM2012C-101
C19
1000pF
C20
1000pF
J3
3302-09P-AFS-0 (MALE)
L1
10UH
R192
120
BC43
104
Q26
KN3904S
Q27
MMBT3906
R193
430
C81
104
R194
75
BD32
FCM2012C-101
SPDIF_OUT
R195
75
SC_SDA
SC_SCL
R87 33
R88 33
U16
AT24C64N-10SC-2.7
SDA
SCL
WC
E0
E1
E2
GND
BC44
104
U17
74LCX04
C23
104
X2
27MHz
R106
2.2M
C24
82P
C25
33P
R103
100K
R104
68K
R102
3K
SC_SDET
R105
56
R107
100K
C26
22N
R108
1K
VD1
1SV215
VD2
1SV215
R210
22
R61
200
C27
NC(10pF)
SRT4402
Title
CPU
Size
A3
Document Number
<Doc>
Rev
R1.3
Date: Sunday, October 26, 2003
Sheet 9 of 12


PTO[0..7]
TS[0..7]
RA11 ARRY_33
RA12 ARRY_33
TS0 TS1 TS2 TS3 TS4 TS5 TS6 TS7
TSO0 TSO1 TSO2 TSO3 TSO4 TSO5 TSO6 TSO7
U24 MM74LCX244MTC
PTO0 PTO1 PTO2 PTO3 PTO4 PTO5 PTO6 PTO7
1A1 1A2 1A3 1A4 2A1 2A2 2A3 2A4
1Y1 1Y2 1Y3 1Y4 2Y1 2Y2 2Y3 2Y4
1G 2G VCC GND
EN_THRU
BC49
104
3.3V
TSO[0..7]
TS_CLK
TS_VALID
R115 100
R116 100
R213 NC(0)
R214 NC(0)
CH_CLK
CH_VALID
R117
1K
EN_THRU
SRT4402
Title
CI
Size
Custom
Document Number
<Doc>
Rev
R1.3
Date: Sunday, October 26, 2008
Sheet 9 of 11


S5V
R5 1K
R6 1K
R7 1K
R8 1K
Q4 KST2222A
Q3 KST2222A
Q2 KST2222A
Q1 KST2222A
U1
D0 D1 D2 D3 D4 D5 D6 D7
Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7
OC CLK VCCs GND
74HCT374DW
R14 1K
R15 330
R28 330
R18 330
Red LED2
GREEN LED3
LED4 Green
BC1 104
LED1
COM1 COM2 D- DP1/2+ E- COM3 DP- COM4
B- G- A- C- DP1/2- F- DP3+ DP3-
LFD416X
J1
CON14
U2
74HCT374DW
BC2 104
I8051BD0
I8051BD1
I8051BD2
I8051BD3
I8051BD4
I8051BD5
I8051BD6
I8051BD7
R19 R20 R21 R22 R23 R24 R25 R26 150
R27 33
EC1 47uF/16V
U3 OUT GND VS
HI-M602H3-2 (HUNIN)
U3 GND VS OUT
TSOP1238
TEMIC
D1 D2 D3 D4 D5 D6 D8 1N4001
S1 UP ARROW KPT1105
S2 DOWN ARROW KPT1105
S3 LEFT ARROW KPT1105
S4 RIGHT ARROW KPT1105
S5 EXIT KPT1105
S6 SELECT KPT1105
S7 POWER(STBY) KPT1105
SRT4402
Title FRONT CIRCUIT
Size B
Document Number IT2K_K2D
Rev R1.1
Date: Sunday, October 26, 2003
Sheet 1 of 1

4. List of Error codes

ERR0: Booting Fail(Flash boot code is broken or CPU surrounding circuit badness.)

ERR1: Booting Success(CPU interior function initialization failure, system memory(U8) access is unstable)

ERR2: CPU interior function initialization success(Became down before NIM initialization)

ERR3: NIM after have done detect normally down become

ERR4: NIM did not detect normally(I2C line badness, NIM badness, Power badness that is supplied to NIM)

ERR5: EEPROM write fail

ERR6: EEPROM write success

ERR7: EEPROM read fail

ERR8: EEPROM read success(F/W downloading again).

5. Trouble Shooting

There may be various reasons for the abnormal operation of the receiver. Check the receiver according to the procedures shown below.

If the receiver does not work properly after checking it, please contact the dealer. Don' s open the receiver cover. It may cause a dangerous situation.

5.1. trouble shooting

Symptom	Cause	Remedy
The display on front Panel does not light up.	The power cord is Not plugged in	Check that the power cord Is plugged in to the wall outlet.
No picture or sound.	Wrong connection of The Audio/Video output Of the receiver to TV. Audio muting. TV power off.	Connect the Audio/Video Output of the receiver to TV correctly Press the MUTE button. Turn TV on.

No picture.	The receiver can't Receive the signal. Incorrect values of some Tuner parameters. Wrong direction of the dish	Check the antenna cable, Replace the cable, or connect The cable to the receiver tightly. Set the values of tuner Parameters correctly in System set-up menu. Check the signal strength With a spectrum analyzer and Adjust your dish correctly.
The remote controller Does not working.	The batteries of the Remote controller are Not inserted or Exhausted.	Check whether the batteries Are inserted correctly in your Remote controller. Check the batteries, and if Exhausted, replace the Batteries of the remote Controller.

5.2. Check point about badness STB

5.2.1. When nothing appears on TV screen

(1) Check the SMPS's voltage

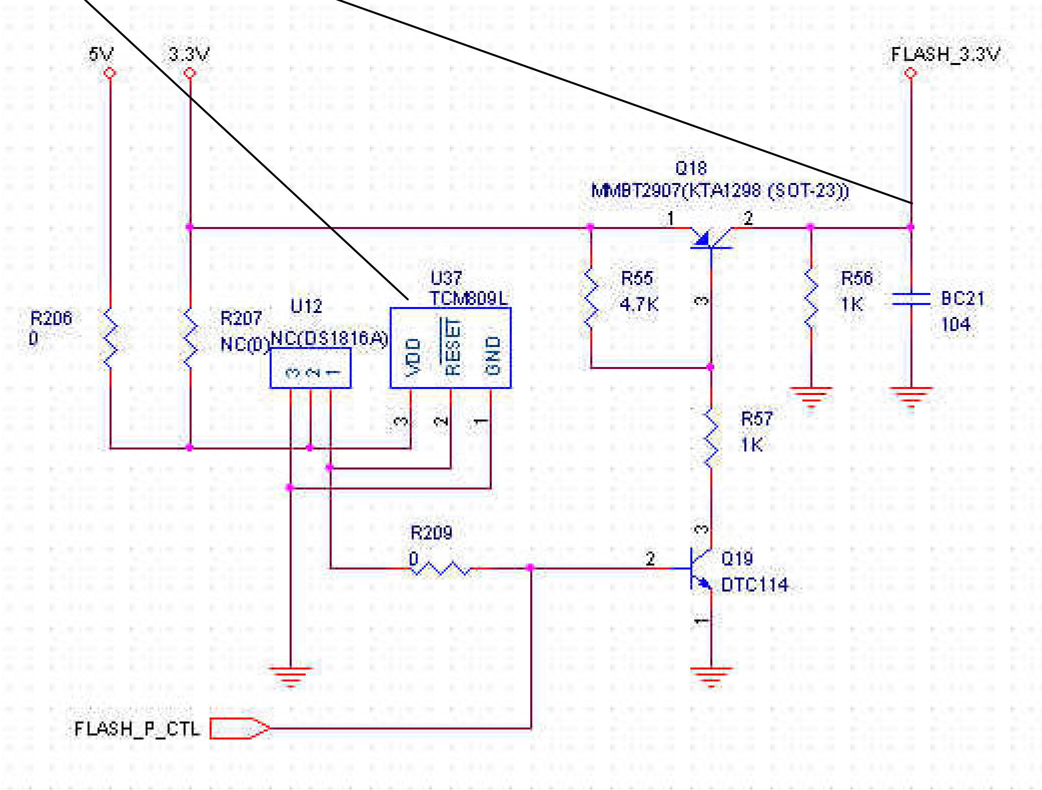
- Power Connect(J6) -> pin3 : 4.75~5.25V
- Power Connect(J6) -> pin10 : 10.2~12.6V
- Power Connect(J6) -> pin11 : 21V~24V
- Power Connect(J6) -> pin5 : 27V ~ 33V
- Power Connect(J6) -> pin1 : 7.5~8.5V
- Power Connect(J6) -> pin7 : 3.2~3.5V

Action) : If voltage is not normalcy, it change, and measure again SMPS first. Still, SMPS is normalcy if voltage is low.There are possibility that is badness with parts that use the voltage in Main Board.

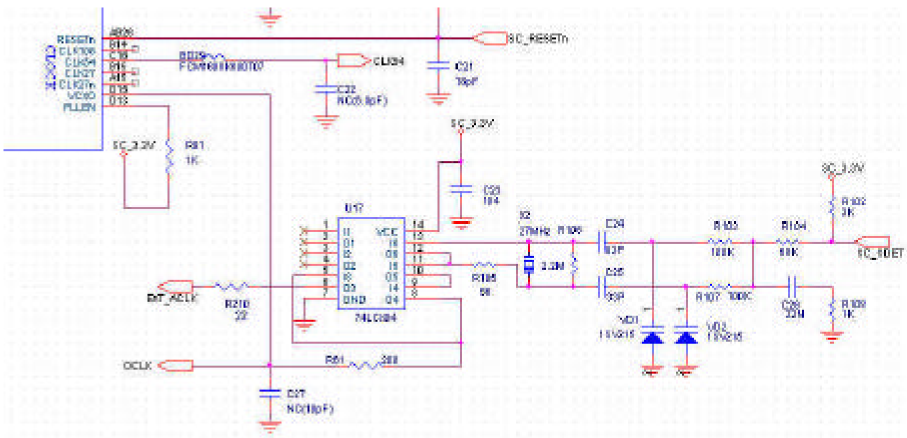
(2) Check the Power;

- ✍ Pls. check whether you can have displayed message or not thru. RS-232 SERIAL PORT terminal after power on, if not, you need to extend your inspection to below point;
  - ✍ Pls. check whether you can have blinked Red LED, pressing Front Key after Power on, if not, pls. replace MICOM(U7)

- Pls. check whether you can have 3.3V input voltage of FLASH ROM(U11), if checked 0V.
- Pls. check U37, if notice input voltage level 1~2V.



- If notice input voltage of Flash Rom 3.3V, pls. check below point;
- Check the frequency value of R61 whether transmitted 27 Mhz, or not thru. Oscilloscope
    - If not transmitted 27MHz, pls. check X2
- Check the frequency value of BD29 whether transmitted 54 Mhz, or not thru. Oscilloscope
    - If not 54MHz, pls. replace SC2005

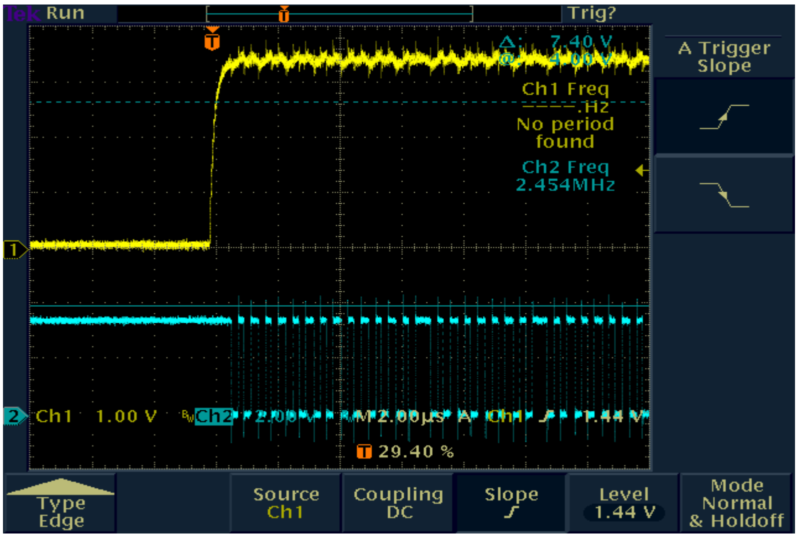


- ✍ Pls. check whether sustain High voltage(About 3.3V) after sudden transmitting of ROM Read cycle(Pulse) from PIN No.26 on U11(39vf800A Flash ROM) when Power on/off.
  - ✍ If not transmitting ROM Read cycle(Pulse), replace SC2005.
  - ✍ If continuing ROM Read cycle(Pulse) without termination, pls. re-test by re-touching Flash Rom, and if notice the same phenomenon despite the former try mentioned above, must replace Flash Rom .

- ✍ Flash-Rom of Start Control Signal uses reset, chip-Select

RESET --✍ Check Point : U11(12pin)

CE -✍ Check Pint : U11(26 pin)



- ✍ If the flash-Rom(U11) not operation. , must be Checking chip-select pin from SC2005. Replacement of part is required. Because Reset and Chip-Select signal is not Booting. Also , Checking soldering or Chip is consider flash-rom and CPU Where are replace of component Part, and Check the insertion of part

(3) Check RS232 TERMINAL MESSAGE;

- ✍ Pls. set up the test atmosphere with STB verified normal operation
  - ✍ Execute Hyper terminal on PC, and Setup as

follows;

Baud Rate: 115200BPS.

Data bit:8 bit

Parity bit :none

Stop bit :1

Control: none,

- ✍ Connect STB and PC with RS232 CABLE, and see if have message when Power ON/OFF.

- ✍ Connect defective STB and PC with RS232 CABLE, and see if have message when Power OFF/ON.

  If not have Message,

  - ✍ Firstly AC power plug off, and then after pressing Menu & Plug button, plug AC Power in again => (boot mode conversion)
    - ✍ If not have any message on above configuration, replace U11(39VF800A flash ROM).

  - ✍ If have "starting boot" Message on PC, pls. terminate Hyper terminal at that stage, and then download Firmware fit for Model thru. ITLINK.
  - ✍ When finishing Downloading, pls. set up by re-executing Hyper terminal, and then plug in/off of STB.
  - ✍ If notice a screen on PC, you must do FACTORY RESET.

    After FACTORY RESET, if you fail to notice Initialization screen or face frozen screen, you must do re-soldering U16(EEPROM).

- ✍ Check with output message;

  - ✍ If have below message or similar one, considered as normal working.

    (Output message would give difference upon Firmware Version)

Reset Low

NIMType : 22

*** frame end (262500)

Complete GPIO Init

Enter Acquisition Task

Viaccess version 1.1r484 compiled on Jun 10 2002:13:12:07STB

identifier is 12 34 56 78 90 12 34 56

QEV_status=0

Version for TWO smart card readers

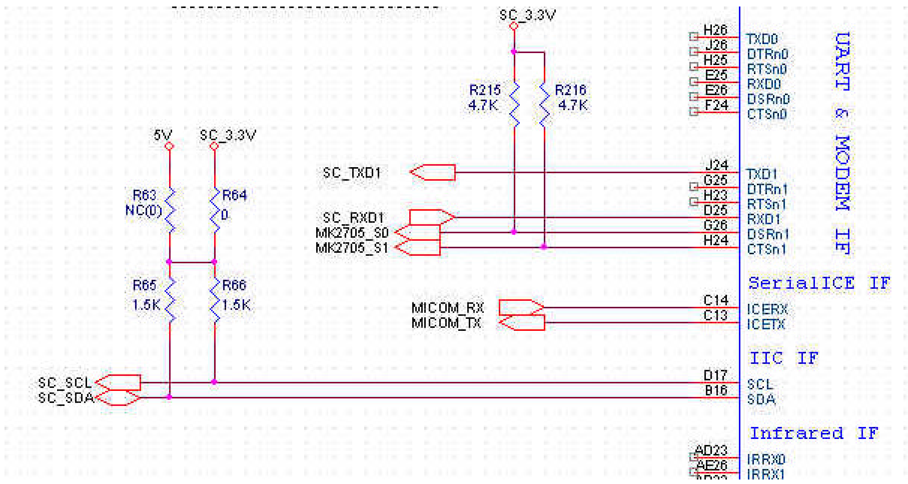
Set : RF Channel (40) (1)

Viaccess version (11) ($x)

Gmmi sess request opened(0) (7)

** date_time enq 1 (60)

- Or, if you have (" ") output Message among above list up, maybe in the middle of above listed message ("I2C ERROR" ,"EEPROM ERROR","TUNER CONNECT FAIL"), Pls. check resister value between U13 D17 and GND, B16 and GND after AC power plug off, and if you have resistor value 20ohm~0 ohm, you must replace SC2005 (CPU).
- If you notice "EEPROM ERROR" Message, Pls. replace U16 :EEPROM(24C64) .
- While do not run I2C signal, LEVEL of I2C signal(SC_SCL, SC_SDA) must be 3.3V



- If you notice "Tuner connect Fail " Message, firstly check the input power for Tuner, and then if O.K, pls. replace Tuner.

5.2.2. When “NO SIGNAL” message appears

(1) U5:(KA317(Regulator))-> pin 3 : 21V~24V

U5:(KA317(Regulator))-> pin 2 : 13V /18V

If confirm that voltage is measured and is not measured, U5 change

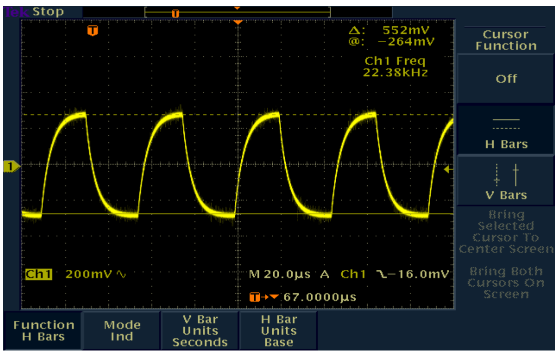
Action) : When U5's(KA317) input voltage is low, do you change SMPS, do U5 Voltage Line check in SMPS if change SMPS and is low.

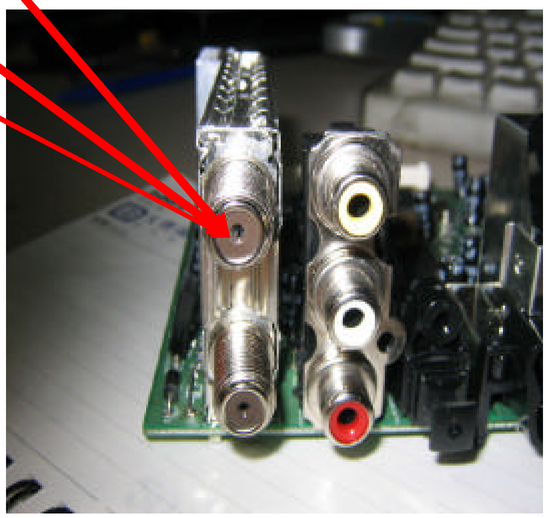
(2) Measure by Voltage Meter(Oscilloscope) whether VERTICAL(13Volt) or HORIZONTAL(18Volt), 22KHz(ON/OFF) is displayed normally measuring voltage of Q4's(TR: KSB772-Y) Emitter when do SCAN satellite in INSTALL MENU.

(LNB supply voltage check)

(3) When LNB voltage(13V/18V) is not displayed, it changes Q4(TR:KSB772-Y) if 13V/18V is displayed measuring Q4's(TR: KSB772-Y) Emitter

- Vertical : 14V . Horizontal : 18V (Switching).
- 22Khz : On/Off (Switching).





(4) Voltage measurement supplied to TUNER

1. BD4 : about 5V,

BD5: about 28V ,

BD3 : about 5V

U3(Regulator) : 3.3V

Action) : If voltage is normalcy TUNER change .

(5) Check I2C Control Signal

Action) : if Voltage is drop SCL as well as SDA. " No Signal " message will

be Display at TV Screen. therefore each of part check have to

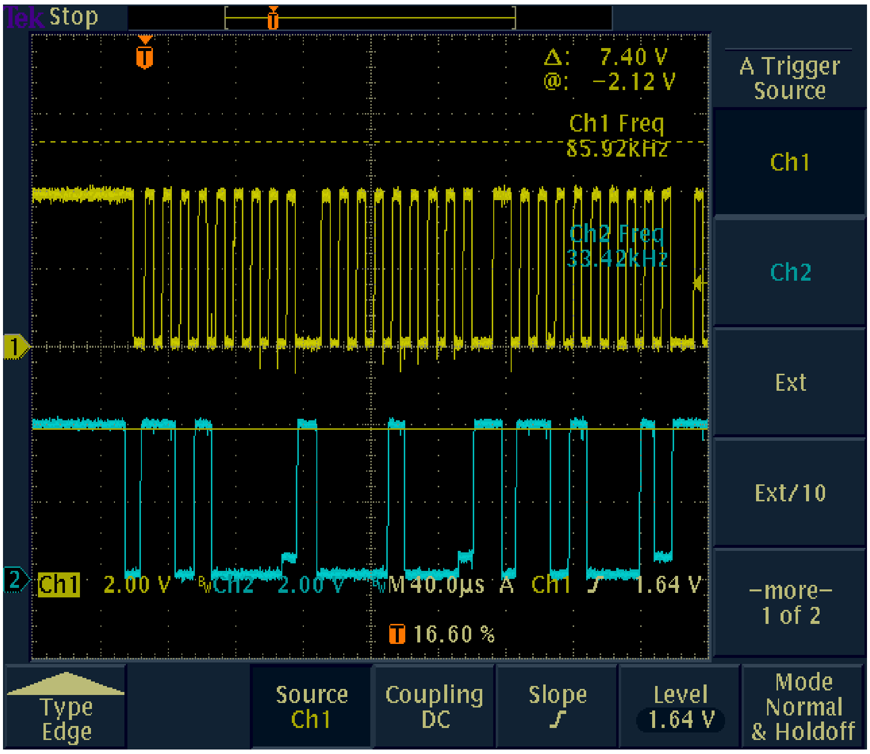
SCL with SDA of Voltage 3.2 ~3.5V. Check the install chip-position

and short of solder, cold solder, etc. Where are replace of

component Part, Check the insertion of part

SCL --✍

SDA --✍



(6) Changing SMPS test

(7) Try scan again after Factory reset

Action) : Do U11(39VF800A Flash ROM) and U13(SC2005) Re-solder

if "Wait to Reset setting" Message comes continually when did

Factory Reset. Still, change U11(39VF800A Flash ROM) if do not become.

5.2.3. When do not act whether FRONT 7-SEGMENT(DISPLAY) acts strangely

(1) Change FRONT PANEL

(2) Change MICOM(U7) (AT89C51)

U7 : Confirm by SCOPE whether 11.0592 MHzs break out in pin 21

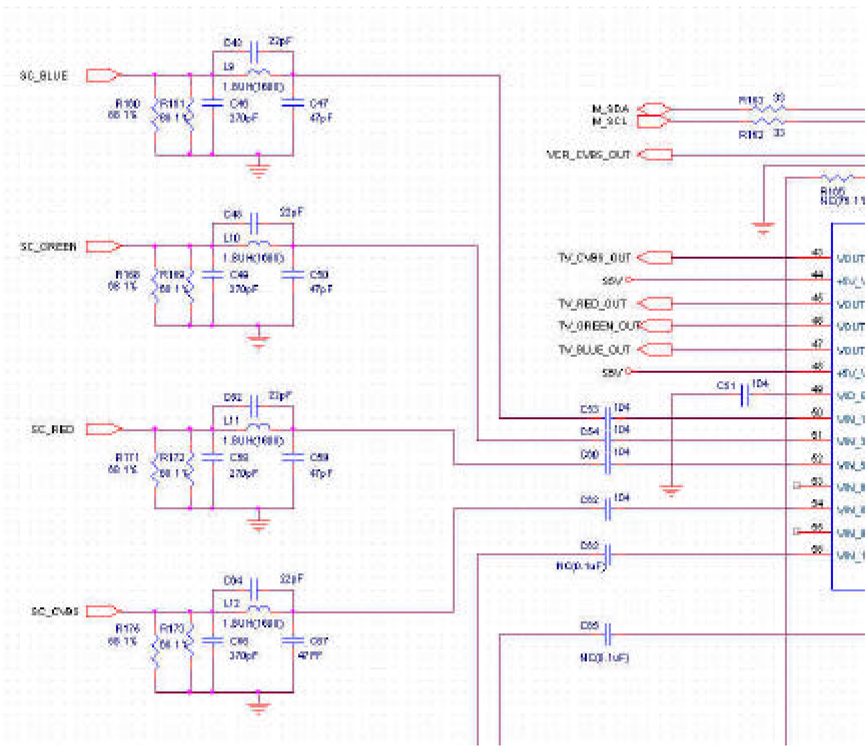
(3) Confirm by SCOPE whether 11.0592 MHzs break out in U7-pin 20, 21

5.2.4. When VIDEO screen gets into Scratch occurrence

(1) If scratch is happened on Video screen and Audio noise or stop phenomenon is happened Tuner change .

(2) Audio is normalcy and if scratch is happened Video screen U10(SDRAM) change

(3) When Video Color is badness, check below circuit



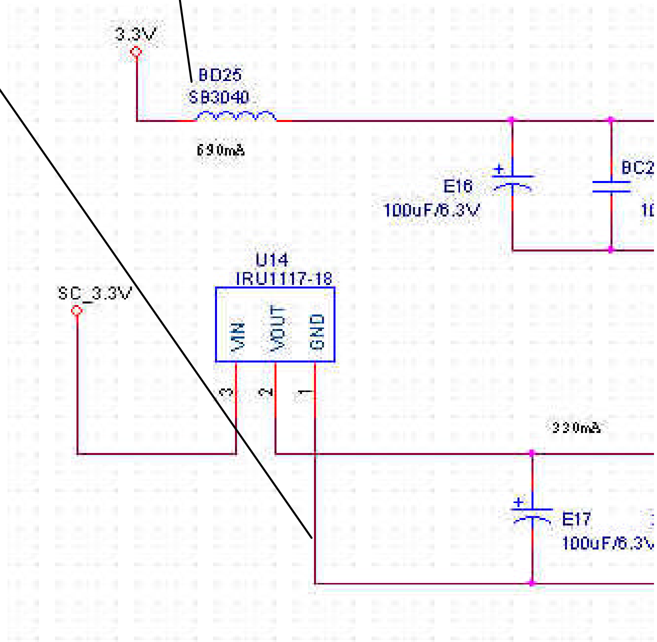
5.2.4. ERR0 CHECK POINT

(1) Change the MICOM(AT89C51).

(2) Check the supply voltage of SC2005(CPU).

✍ Check the voltage : 3.3V

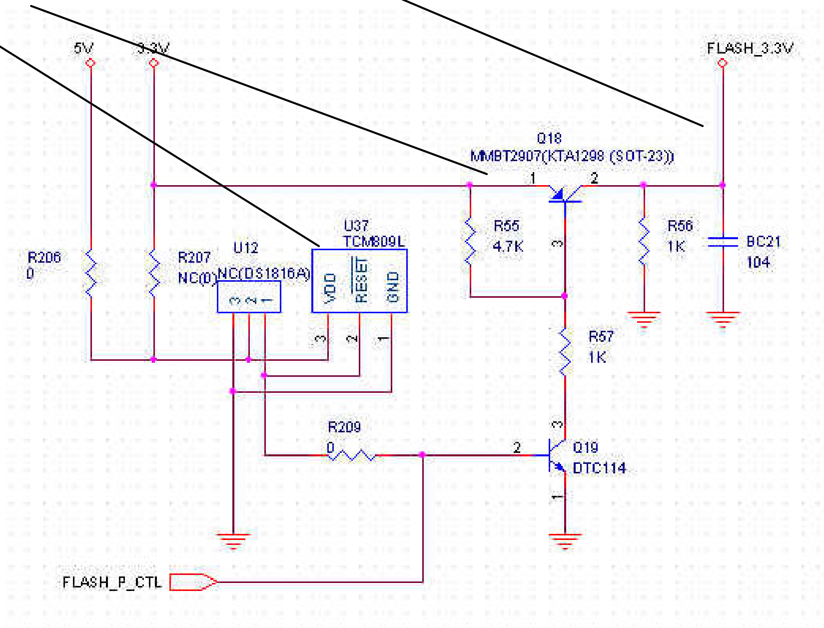
✍ Check the voltage : 1.8V



(3) Check the supply voltage of flash ROM.

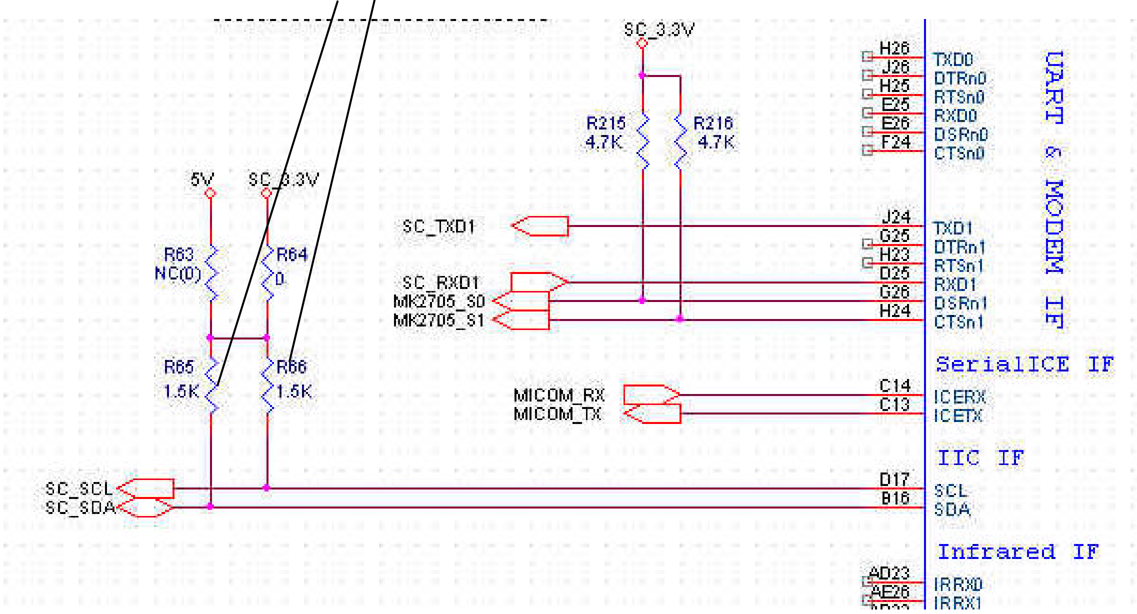
✍ check the flash supply voltage : about 3.2V.

✍ Check point U37 or Q18 if flash ROM supply voltage about 0~2V.



(4) Check the level of I2C line .

- check the level of R66(SC_SCL). -> normal level (3.1V~3.3V).
- check the level of R65(SC_SDA) -> normal level (3.1V~3.3V).



4.3 Check the supply voltage to TUNER if either R40 or R41 is low level (0v~2).

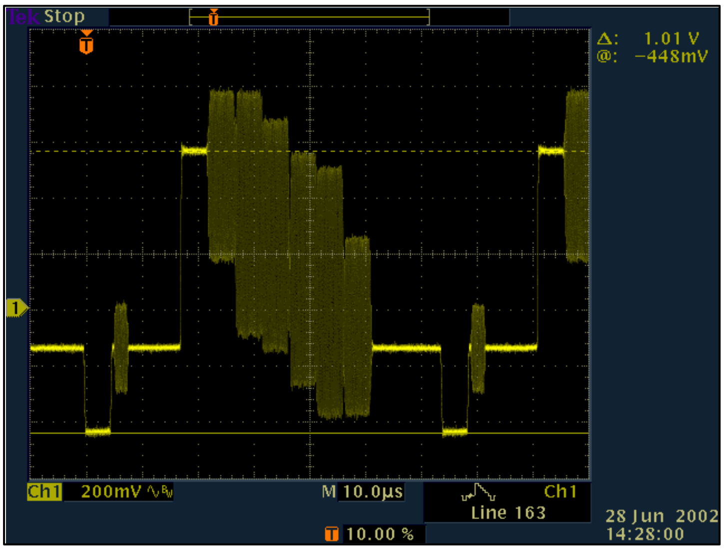
4.4 Change the TUNER unit if the TUNER supply voltage is normal state.

4.5 Maybe CPU problem if same condition after changed the TUNER.

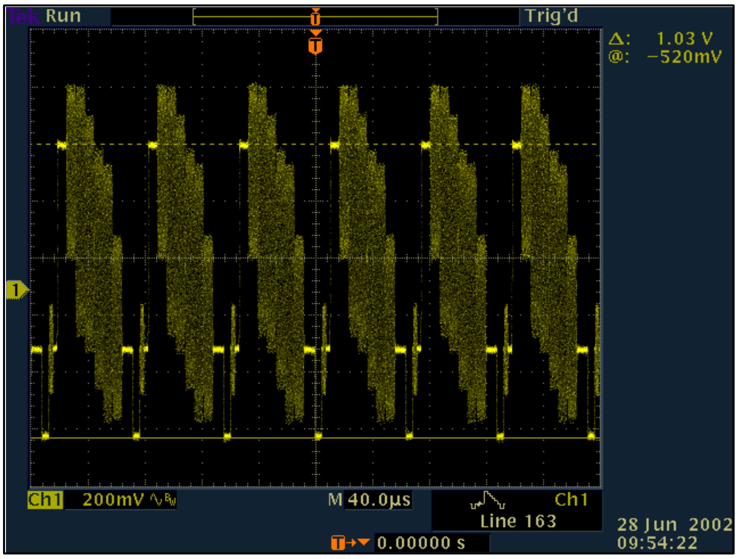
5.2.6. refer video waveform

(1) Composite level

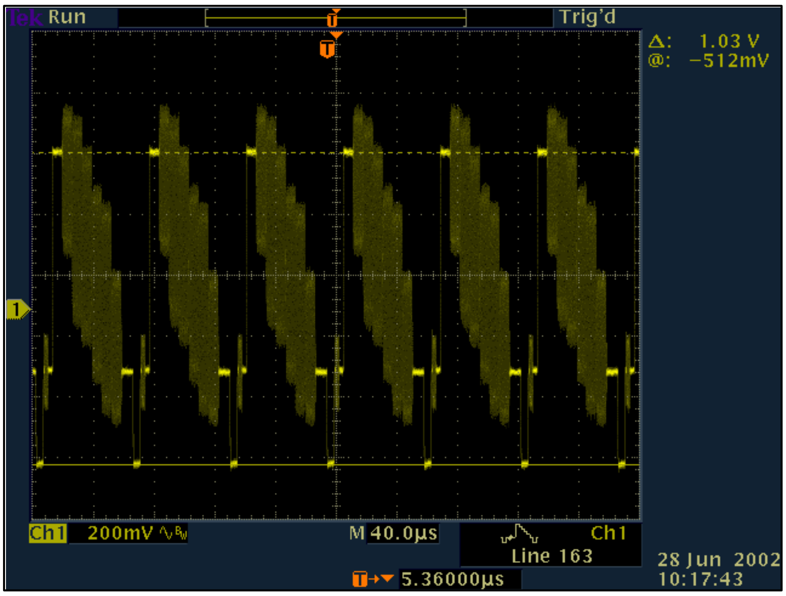
- RCA



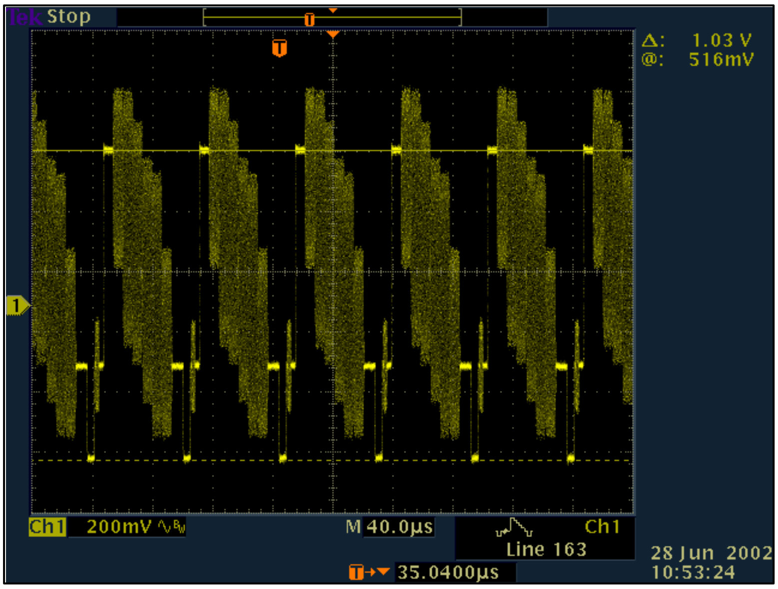
- RF



- TV

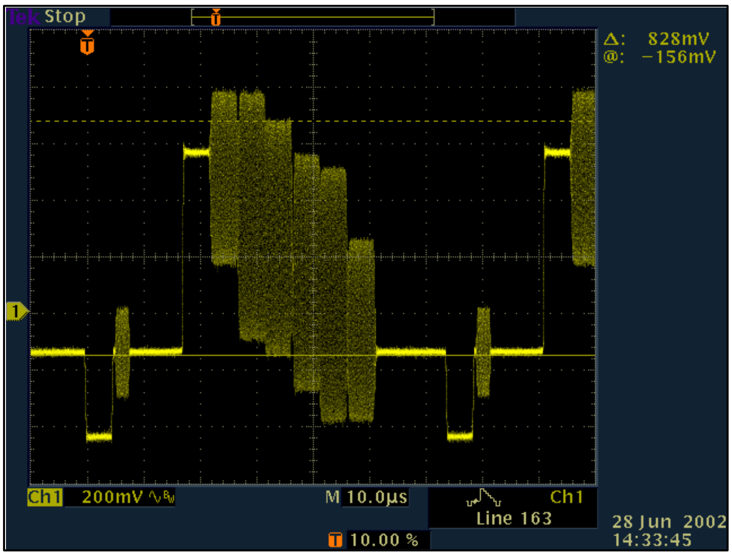

Tek Run
Trig'd
Δ: 1.03 V
@: −512mV
Ch1 200mV
M 40.0µs
Ch1
Line 163
5.36000µs
28 Jun 2002
10:17:43

- VCR

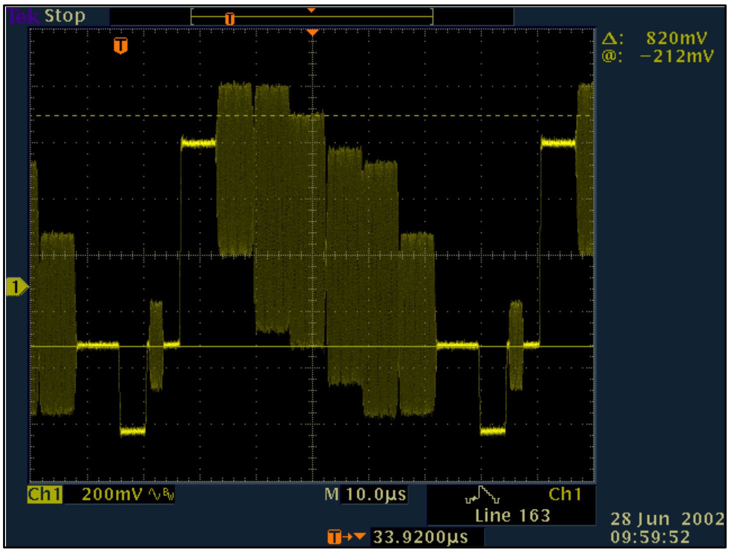

Tek Stop
Δ: 1.03 V
@: 516mV
Ch1 200mV
M 40.0µs
Ch1
Line 163
35.0400µs
28 Jun 2002
10:53:24

(2) GREEN

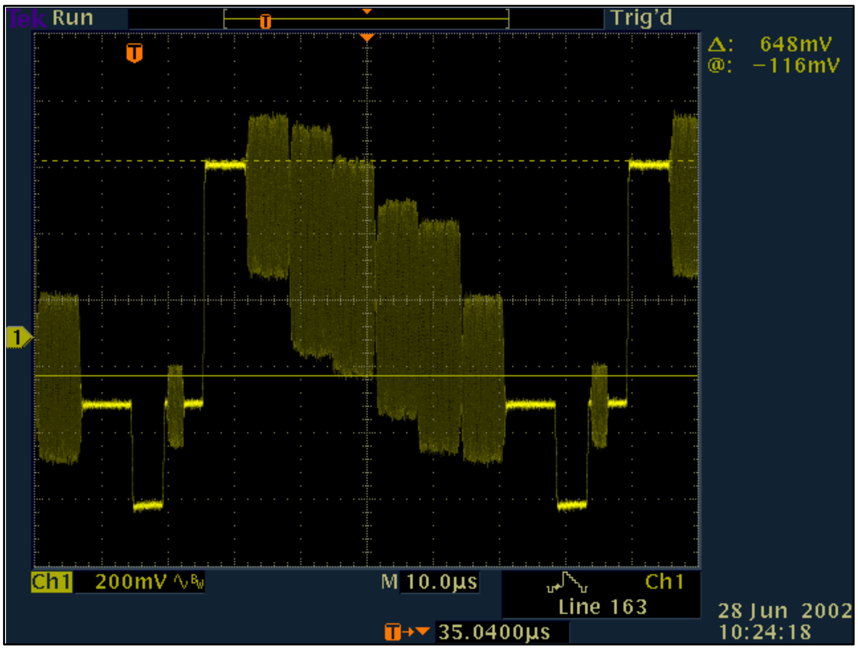
- RCA



- RF

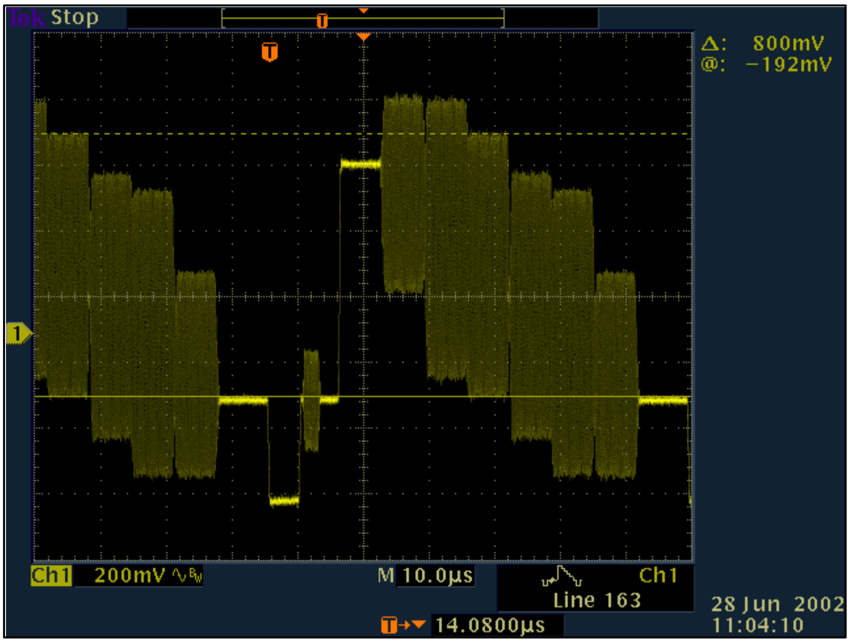


- TV



Tek Run
Trig'd
Δ: 648mV
@: −116mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
35.0400µs
28 Jun 2002
10:24:18

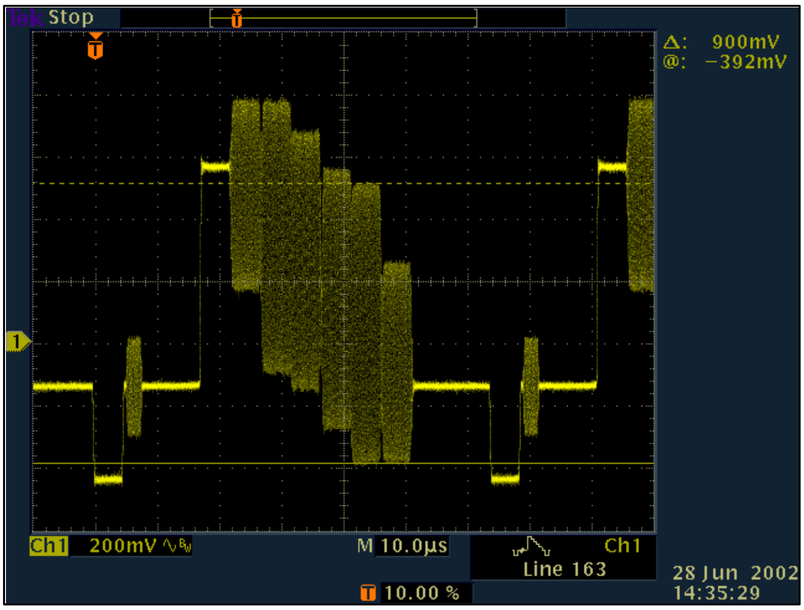
- VCR



Tek Stop
Δ: 800mV
@: −192mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
14.0800µs
28 Jun 2002
11:04:10

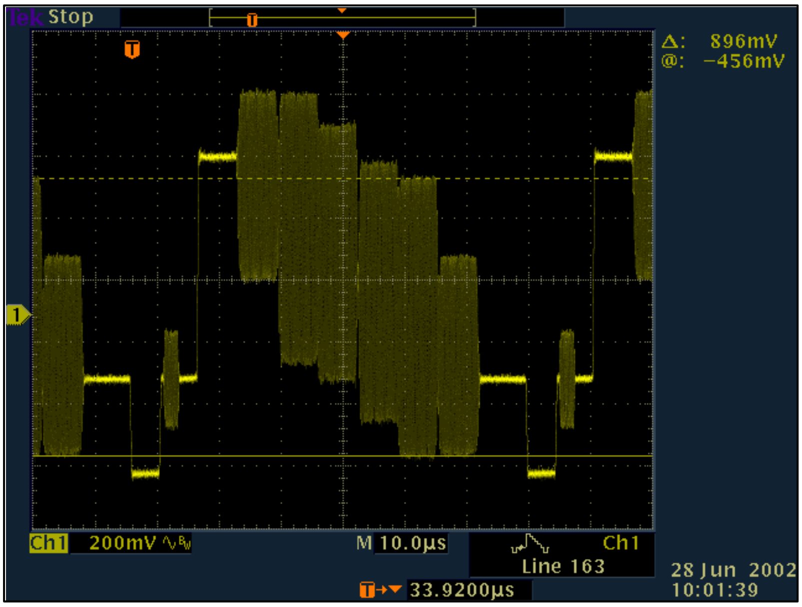
(3) RED

- RCA



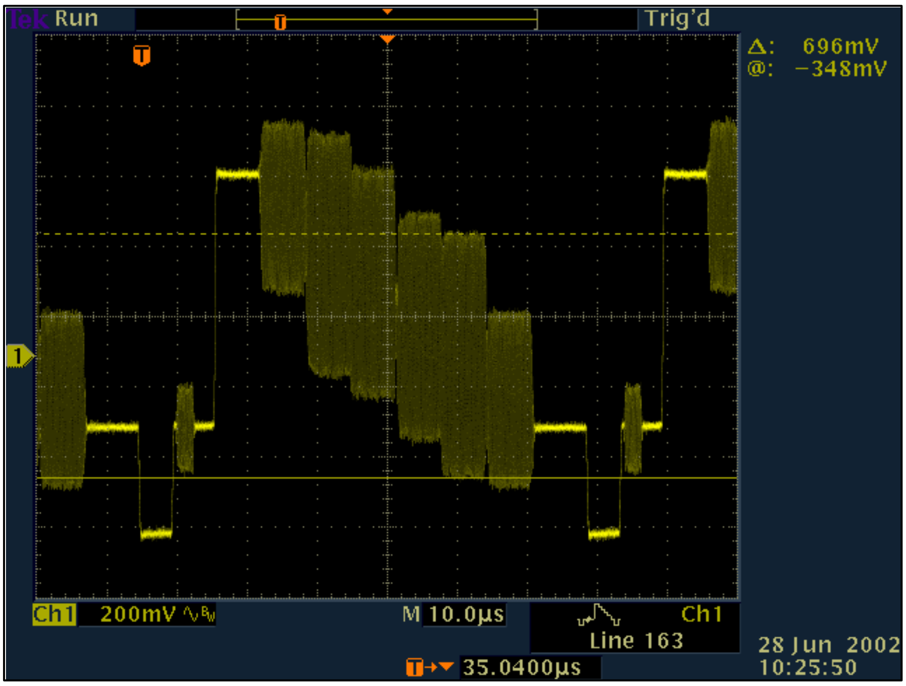
Tek Stop
Δ: 900mV
@: −392mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
10.00 %
28 Jun 2002
14:35:29

- RF

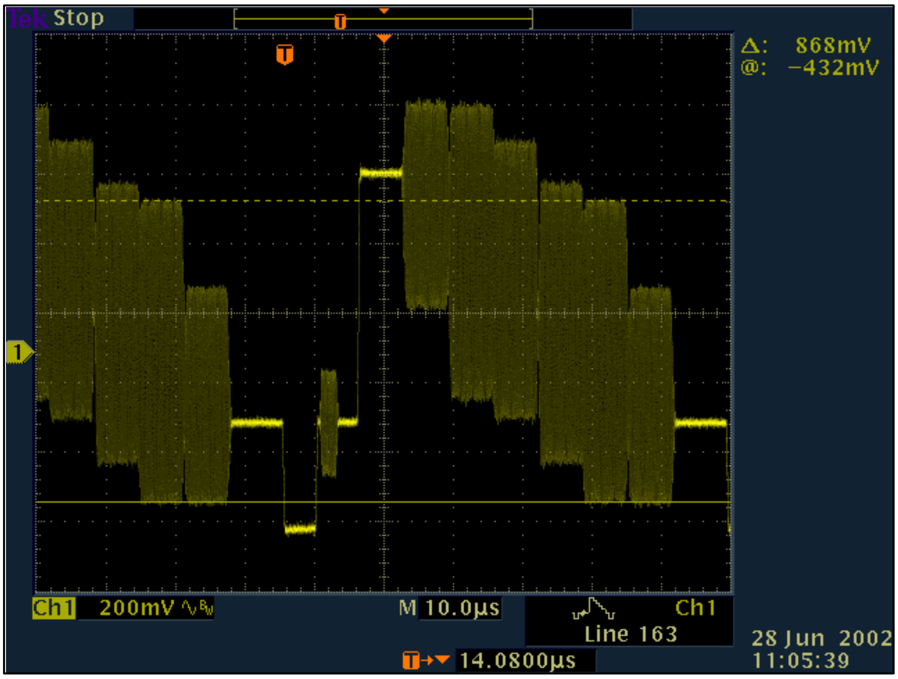


Tek Stop
Δ: 896mV
@: −456mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
33.9200µs
28 Jun 2002
10:01:39

- TV

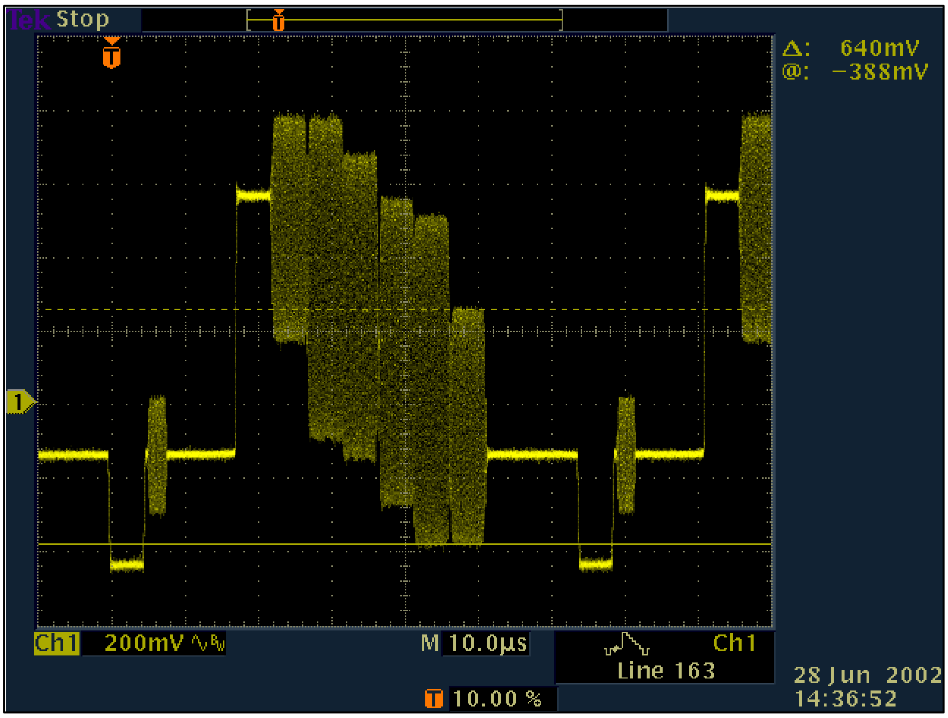

Tek Run
Trig'd
Δ: 696mV
@: −348mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
35.0400µs
28 Jun 2002
10:25:50

- VCR

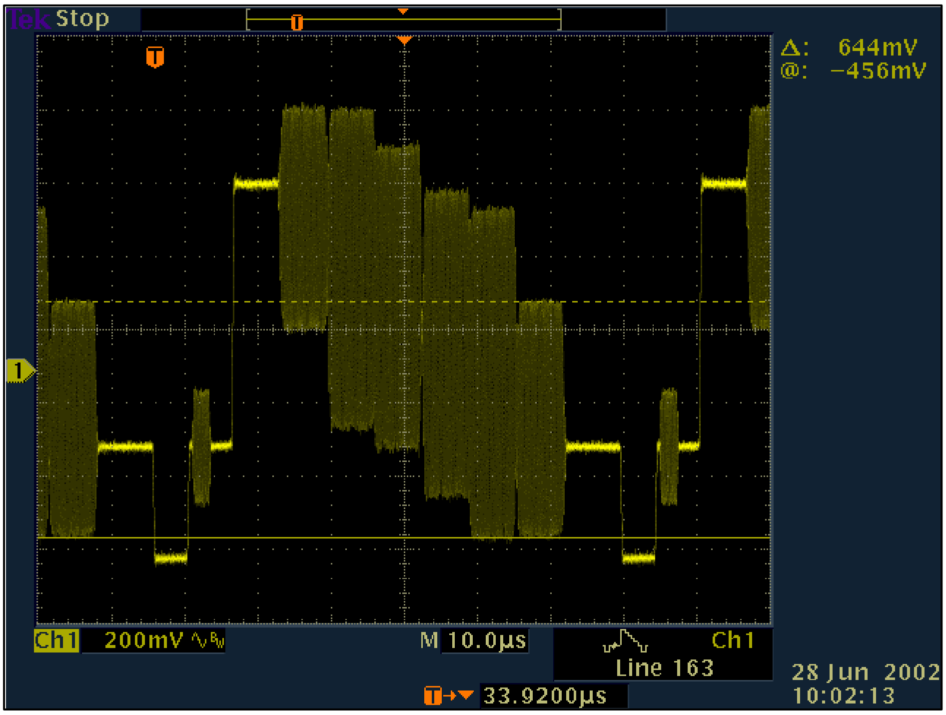

Tek Stop
Δ: 868mV
@: −432mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
14.0800µs
28 Jun 2002
11:05:39

(4) BLUE

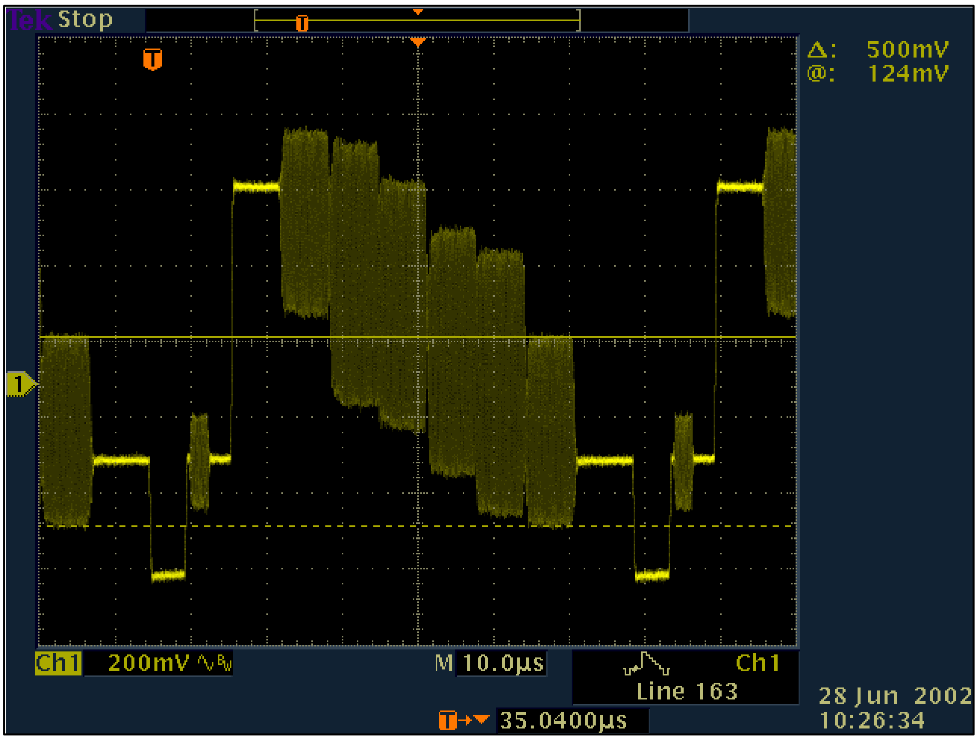
- RCA


Tek Stop
Δ: 640mV
@: −388mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
10.00 %
28 Jun 2002
14:36:52

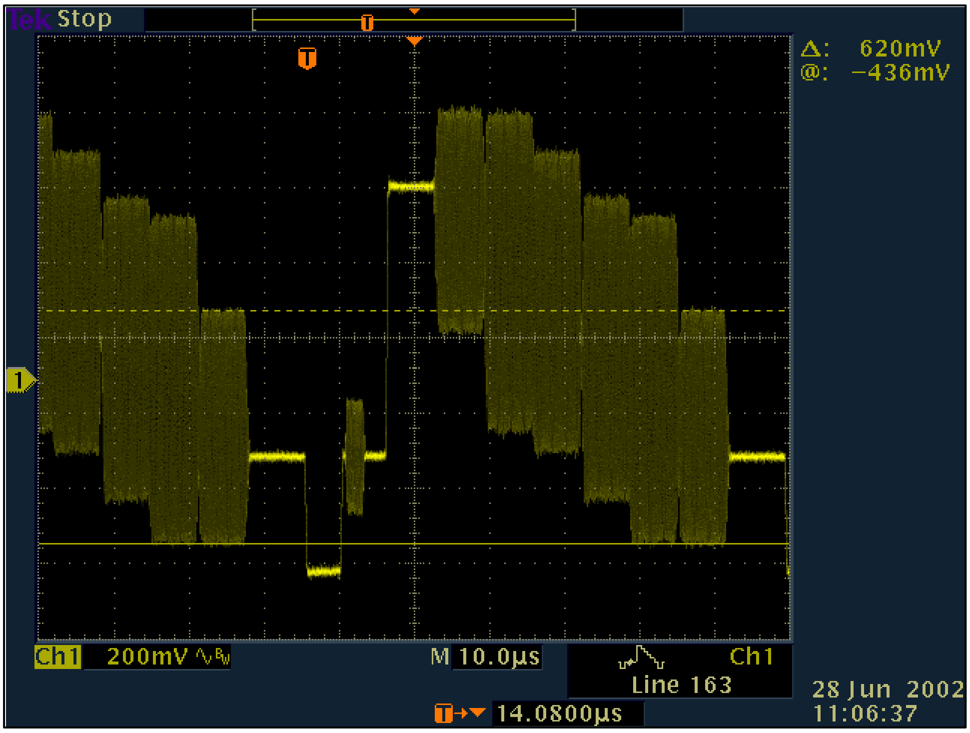
- RF


Tek Stop
Δ: 644mV
@: −456mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
33.9200µs
28 Jun 2002
10:02:13

- TV

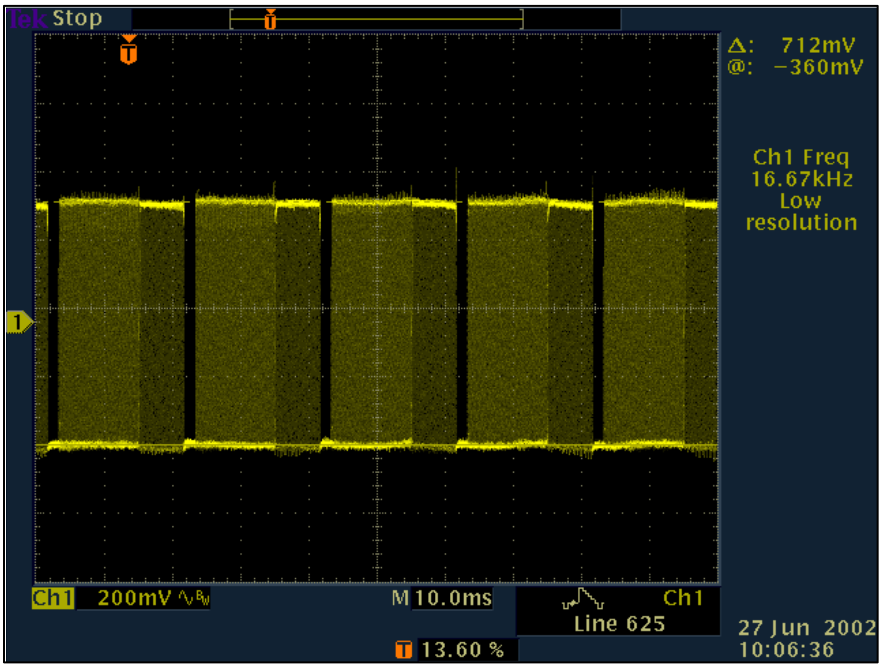

Tek Stop
Δ: 500mV
@: 124mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
35.0400µs
28 Jun 2002
10:26:34

- VCR

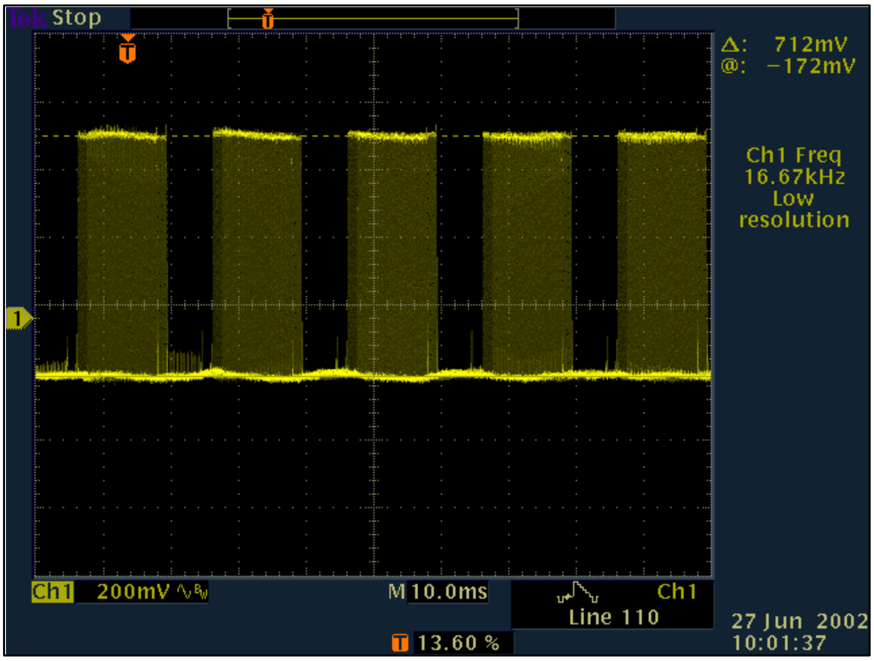

Tek Stop
Δ: 620mV
@: −436mV
Ch1 200mV
M 10.0µs
Ch1
Line 163
14.0800µs
28 Jun 2002
11:06:37

(5) RGB

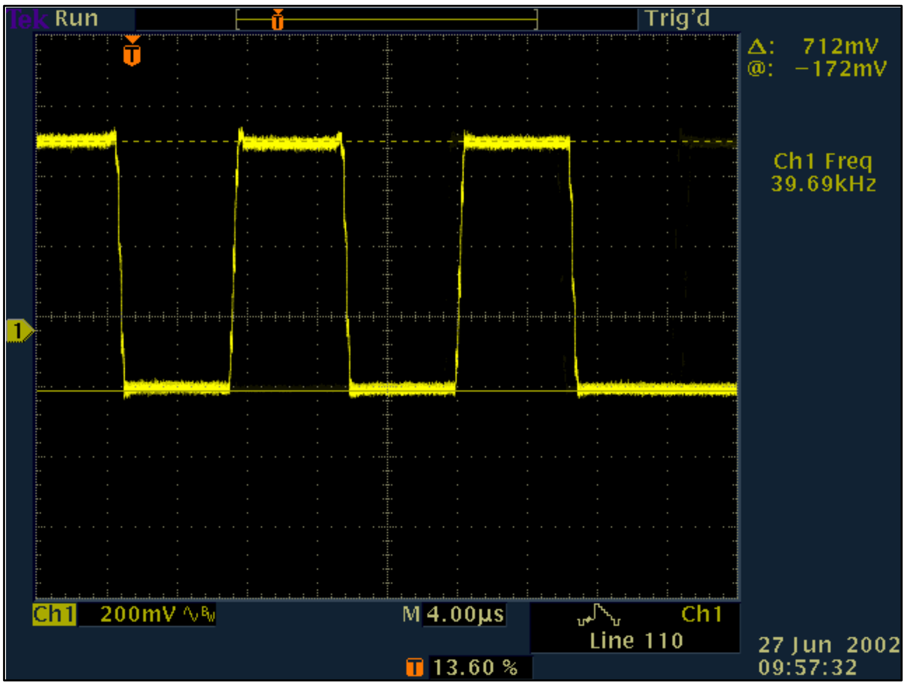
- TV SCART(RED)



- TV SCART(GREEN)



- TV SCART(BLUE)



6. Materials list

6.1 Main PCB materials list

NO	PART NUMBER	DESCRIPTION	Vendor		
1	IT2K5SEK2-R1.3	K2 FRONT 용 MAIN PCB VER R1.3		1	
2	FCM2012C-101T06	100+/-25% ohm,100MHz,600mA, 2012size	TAI-Tech	20	BD1,BD2,BD3,BD4,BD5,BD6,BD15, BD16,BD19,BD20,BD21,BD22,BD23, BD24,BD27,BD28,BD33,BD35, BD36,BD37
3					
4	CR 1/16 220 JT	22ohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	2	BD26, BD31
5	SMB403025		TAI-Tech	8	BD8,BD9,BD10,BD11,BD12,BD13, BD14,BD25
6	FCI2012-100K	10uH, +/-10%, 2012SIZE	TAI-Tech	3	L2,L3,L6
7	FCI1608-1R8K	1.8uH, +/-10%, 1608SIZE	TAI-Tech	6	L4,L5,L9,L10,L11,L12
8	CR 1/16 472 JT	4.7Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	23	R1,R6,R28,R30,R32,R35,R36, R49,R50,R55,R67,R68, R71,R72,R73,R74,R75,R76,R77,R78, R90,R215,R216
9	CR 1/16 000 JT	0ohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	7	R46,R64,R139,R206,R209,R213,R214
10	CR 1/16 330 JT	33ohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	9	R4,R8,R20,R21,R34,R87,R88, R163,R162
11	CR 1/16 103 JT	10Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	38	R2,R7,R19,R38,R39,R41,R42,R53, R69,R70,R82,R83,R84,R85,R86,R92, R93,R94,R95,R96,R97,R98,R99, R100,R101,R143,R198,R199,R200, R201,R202,R203,R204,R205,R158, R159,R196,R197
12	CR 1/16 102 JT	1Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	9	R56,R57,R59,R60,R91,R108, R134,R153,R117
13	CR 1/16 223 JT	22Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R146
14	CR 1/16 682 JT	6.8Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R152
15	CR 1/16 152 JT	1.5Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	2	R66,R65
16	CR 1/16 272 JT	2.7Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R79
17	CR 1/16 101 JT	100ohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	3	R31,R115,R116
18	CR 1/16 104 JT	100Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	4	R3,R5,R103,R107
19	CR 1/16 302 JT	3Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R102
20	CR 1/16 560 JT	56ohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R105
21	CR 1/16 225 JT	2.2Mohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R106
22	CR 1/16 122 JT	1.2Kohm, 5%, 1/16W, DA, TP, 1608	HAN RYUK	1	R136

23	CR 1/16 201 FT	200ohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	1	R61
24	CR 1/16 112 FT	1.1Kohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	1	R89
25	CR 1/16 750 FT	75ohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	12	R150,R164,R166,R167,R170, R174,R179,R180,R186,R187, R188,R189
26	CR 1/16 680 FT	68ohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	8	R160,R161,R168,R169,R171, R172,R173,R175
27	CR 1/16 683 FT	68Kohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	2	R104,R178
28	CR 1/16 151 FT	150ohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	2	R151,R181
29	CR 1/16 8251 FT	8.25Kohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	4	R137,R140,R148,R154
30	CR 1/16 4752 FT	47.5Kohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	4	R138,R141,R149,R155
31	CR 1/16 154 FT	150Kohm, 1%, 1/16W, DA, TP, 1608	HAN RYUK	4	R135,R142,R147,R156
32	CR 1/10 471 JT	470ohm, 5%, 1/10W, DA, TP, 2012	HAN RYUK	2	R11,R45
33	CR 1/10 391 JT	390ohm, 5%, 1/10W, DA, TP, 2012	HAN RYUK	1	R23
34	CR 1/10 331 JT	330ohm, 5%, 1/10W, DA, TP, 2012	HAN RYUK	1	R47
35	CR 1/10 122 JT	1.2Kohm, 5%, 1/10W, DA, TP, 2012	HAN RYUK	1	R37
36	CR 1/10 103 JT	10Kohm, 5%, 1/10W, DA, TP, 2012	HAN RYUK	1	R182
37	CR 1/10 472 JT	4.7Kohm, 5%, 1/10W, DA, TP,2012	HAN RYUK	4	R24,R29,R10,R44
38	CR 1/10 63R4 FT	63.4ohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R25
39	CR 1/10 221 FT	220ohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R18
40	CR 1/10 472 FT	4.7Kohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R22
41	CR 1/10 301 FT	300ohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R17
42	CR 1/10 512 FT	5.1Kohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R15
43	CR 1/10 333 FT	33Kohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R14
44	CR 1/10 202 FT	2Kohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R40
45	CR 1/10 183 FT	18Kohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R13
46	CR 1/10 273 FT	27Kohm, 1%, 1/10W, DA, TP, 2012	HAN RYUK	1	R16
47	CR 1/8 272 JT	2.7Kohm, 5%, 1/8W, DA, TP, 3216	HAN RYUK	1	R26
48	CR 1/8 182 JT	1.8Kohm, 5%, 1/8W, DA, TP, 3216	HAN RYUK	1	R33
49	CR 1/8 103 JT	10Kohm, 5%, 1/8W, DA, TP, 3216	HAN RYUK	1	R208
50	CN 164 472 JT	4.7Kohm, 5%, 1/16W, L, CHIP, 4P, TP, 1608	HAN RYUK	1	RA1
51	CN 164 330 JT	33ohm, 5%, 1/16W, L, CHIP. 4P, TP, 1608	HAN RYUK	2	RA11,RA12
52	CN 164 103 JT	10Kohm, 5%, 1/16W, L, CHIP, 4P, TP, 1608	HAN RYUK	2	RA2,RA3
53	CS1608Y5V104Z500NR	100nF, +80-20%, 50V, Y5V, TP,1608	SAMWHA	77	C1,BC1,C2,BC2,C3,BC3,C4,BC4,C5, BC5,BC6,BC7,C8,BC8,C9,BC9,C10, BC10,BC11,BC12,C13,BC13,C14 BC14,C15,BC15,BC16,BC17,BC18, BC19,BC20,BC21,BC22,C23, BC24,BC25,BC26,BC27,BC28, BC29,BC30,BC31,BC32,BC33, BC34,BC35,BC36,BC37,BC38,BC39, BC40,BC41,BC42,BC44, BC49,C51,C53,C54,C55,

					C60,C61,BC61,C62,BC62,BC63, BC64,BC65,BC66,BC67,C68, BC68,C69,C70,C71,C74,C84,BC69
54	CS1608COG391J500NR	390pF, 5%, 50V, NPO, TP, 1608	SAMWHA	4	C34,C36,C37,C38
55	CS1608COG271J500NR	270pF, 5%, 50V, NPO, TP, 1608	SAMWHA	6	C35,C39,C46,C49,C58,C66
56	CS1608COG220J500NR	22pF, 5%, 50V, NPO, TP, 1608	SAMWHA	4	C43,C48,C52,C64
57	CS1608COG820J250NR	82pF,5%,25V, NPO, TP, 1608	SAMWHA	1	C24
58	CS1608X7R102J500NR	1000pF, 5%, 50V, X7R, TP, 1608	SAMWHA	11	C19,C20,C33,C40,C41,C44, C45,C56,C57,C72,C73
59	CS1608COG180J500NR	18pF, 5%, 50V, NPO, TP, 1608	SAMWHA	3	C16,C17,C21
60	CS1608COG101J500NR	0.1nF, 5%, 50V, NPO, TP, 1608	SAMWHA	2	C32,C31
61	CS1608COG470J500NR	47pF, 5%, 50V, NPO, TP, 1608	SAMWHA	4	C47,C50,C59,C67
62	CS1608Y5V224Z250NR	220nF, +80-20%, 25V, Y5V, TP,1608	SAMWHA	2	C6,C7
63	CS1608COG330J500NR	33pF, 5%, 50V, NPO, TP, 1608	SAMWHA	1	C25
64	CS1608X7R223K500NR	22nF, 10%, 50V, X7R, TP, 1608	SAMWHA	1	C26
65	RLS4148	HIGH SPEED SWITCHING DIODE,100V,450mA,LL-34	ROHM	1	D3
66	1SV215	30V, 10NA, USC, TP	Toshiba	2	VD1,VD2
67	DTC114EKA	NPN DIGITAL TRANSISTORS(built-in resistors), 100mA,200mW,SC-59	ROHM	8	Q2,Q3,Q10,Q11,Q12,Q13,Q17,Q19
68	KST3904-MTF	NPN EPITAXIAL SILICON TRANSISTOR,-60V,-40V, -200mA,350mW,SOT-23	SAMSUNG	7	Q5,Q6,Q7,Q8,Q14,Q15,Q25
69	KST3906-MTF	PNP EPITAXIAL SILICON TRANSISTOR, -200mA,350mW,SOT-23	SAMSUNG	1	Q24
70	MMBT2907	PNP General Purpose Amplifier,800mA, - 50~+150,SOT-23	Fairchild	1	Q18
71	SC2005 F2	Industry-standard TinyRISC® 108Mhz MIPS CPU	LSI	1	U13
72	SST39VF800A-70-4C-EK	1MX8BIT Multi-Purpose Flash,TSOP,48P,3.3V,70ns	SST	1	U11
73	AT24C64N-10SC-2.7	2-wire serial cmos EEPROM,64KBYTE,SOIC,8P,3.3V	ATMEL	1	U16
74	K4S641632E-TC75	1M*16BIT*4BANKSB Synchronous DRAM, 133MHz,8M용,TSOP-54	SAMSUNG	2	U8,U10
75	TCM809LENB	3PIN Microprocessor Reset Monitors,SOT23B,-40~+85	MICROCHIP	1	U37
76	CXA2161R	I2C Bus Compatible Audio Video Switch & Electronic Volume Control,LQFP-56P	Sony	1	U36
77					
78	KA358AD	DUAL OPERATIONAL AMPLIFIER, SOP, 8P, 150MIL, DUAL, 100V/Mv	Fairchild	2	U6,U35
79	SPX1117M3-33	800mA Low Dropout Voltage Regulator,3.3V,SOT223	SIPEX	1	U3
80	IRU1117-18CY	0.8A,LDO FIXED 1.8V,SOT223	IR	1	U14
81	74LCX244MTC	Low-Voltage CMOS Octal Buffer,3.3V,-65~+150,TSSOP	Fairchild	1	U24
82	74LCX04M	LOW VOLTAGE HEX INVERTER,SOP,14P	Fairchild	1	U17
83	ST3232CD	3.3V,0~+70,SO-16	ST	1	U15
84	TDA8004T	IC card interface,28PIN,SOIC	PHILIPS	2	U1,U2

85	3262-44-T	LOW-PROFILE SMT PLCC SOCKET, 44PIN,TIN PLATED	ILSSAN	1	U7 SOCKET

NO	PART NUMBER	DESCRIPTION	Vendor		
1	RSS-47/25-5*11*5	47uF/25V-5*11*5, FORMING CUT TYPE	DAEWOO	3	E4,E8,E39
2	RSS-10/50-5*11*5	10uF/50V-5*11*5, FORMING CUT TYPE	DAEWOO	1	E7
3	RSM-10/25-5*7*5	10uF/25V-5*7*5, FORMING CUT TYPE	DAEWOO	22	E1,E2,E9,E10,E11,E13,E14,E15, E18,E22,E24,E29,E30,E31,E32,E33, E34,E36,E37,E38,E41,E42
4	RSM-22/16-5*7*5	22uF/16V-5*7*5, FORMING CUT TYPE	DAEWOO	1	E35
5	RSS-22/50-5*11*5	22uF/50V-5*11*5, FORMING CUT TYPE	DAEWOO	2	E6,E40
6	RSS-100/10-5*11*5	100uF/10V-5*11*5, FORMING CUT TYPE	DAEWOO	1	E5
7	RSS-100/25-6.3*11*5	100uF/25V-6.3*11*5, FORMING CUT TYPE	DAEWOO	6	E3,E16,E17,E23,E25,E28
8	MTZ J 33B	30V ZENER DIODE	ROHM	1	D2
9	1N4004ID	400V,1A,DO-41	PHILIP	1	D1
10	1N5819	40V, 1A, D0-41, TP	PHILIP	2	D5,D6
11	RNL 1 1R0 JT-52	1ohm,5%,1W,AA,TP	HAN RYUK	1	R12

NO	PART NUMBER	DESCRIPTION	Vendor		
1	5267-11	2WALL, 11P, 1R, 2.5mm, STRAIGHT	MOLEX	1	J6
2	3302-09P-AFS-0	DB9,MALE,RIGHT ANGLE	ILSSAN	1	J3
3	SMW200-14	14-Pin Wafer,LOCKING TYPE	SUNGHYUN	1	J2
4	HS-DF08IC1-1	smart card reader connector double type	HYOSUNG	1	P1
5	JS0401315N	4P,6MM	DAERYUNG	1	J5
6	2203-42ST(-A-)	DUAL,42P,RIGHT ANGLE DOUBLE TYPE	ILSSAN	1	P2
7	KSB772-Y	PNP Audio Frequency Power Amplifier, 10W,-55~+150, T0-126,	Fairchild	3	Q1,Q9,Q16
8	TIP42C	PNP epitaxial silicon TR, TO-220	Fairchild	1	Q4
9	KA7805AT(TU)	3-Terminal 1A Positive voltage regulators,5V OUT,3P,TO-220	Fairchild	1	U33
10	KA317(TU)	3-Terminal Positive adjustable regulator,3P,TO-220	Fairchild	1	U5
11	002A-1 TYPE		KYUNGWON	1	U5 HEAT SINK
12	27MHz	0.0020%,HC-49/U,79pF,35ohm,BK	Kony	1	X2
13	11.0592MHz	0.0030%,HC-49/S,18pF,60ohm,BK	SHINYOUNG	1	X1
14	RMUP74055FS		SAMSUNG	1	U34
15	BS2F7VZ0184	SHARP,STV0299 QPSK DEMODULATOR	SHARP	1	U4

NO	PART NUMBER	DESCRIPTION	Vendor		
1	AT89C51-12/16/20/24JC(I)	8-BIT Microcontroller with 4K bytes Flash, PLCC, 44PIN	ATMEL	1	U7

2	KKJ650(CORE)	AC POWER CORD	YOUNGSYM	1	
3	TT2,BIN(+),WTH3X6		JUNGWON	1	
4	ZGMBUSHING	4P RCA JACK-COVER	DAERYUNG	1	
5	FE-08		FIRST	1	

NO	PART NUMBER	DESCRIPTION	Vendor		
1	SRT4402			1	
2	R.C.U, 1.5V,AAA			2	
3	MANUAL PACKING			1	
4	BOX GIFT LABEL			1	
5	CHASSIS BOTTOM LABEL			1	
6	FLASH ROM LABEL			1	
7	MICOM LABEL			1	
8				1	

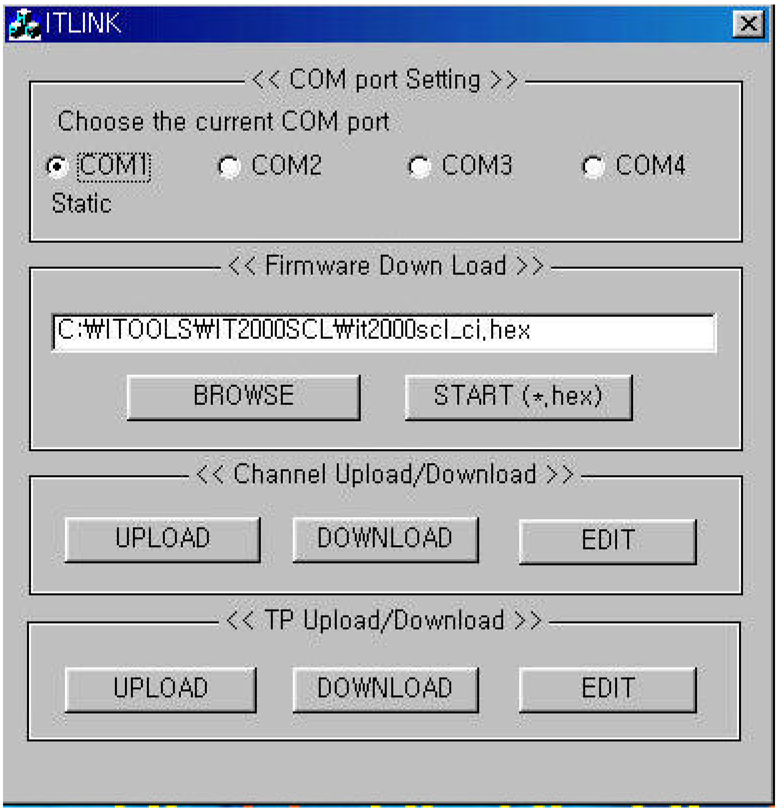
6.2 FRONT PCB materials list

NO	PART NUMBER	DESCRIPTION	Vendor		
1	IT2K_K2D-R1.1			1	
2	CR051BX7R104Z500R	100nF, 10%, 50V, X7R	SAMWHA	2	BC1,BC2
3	IT01B14L-150(C)	14P, 150M/M(LOCK) ,CORE TYPE	SUNGHYUN	1	J1
4	LH3330	RED,5mm,565mm	LIGITEK	1	LED2
5	LG3330	GRN,5mm,565mm	LIGITEK	1	LED3
6	PN2222ATA	PNP SWITCHING TRANSISTOR,600mA,40V,TO-92	KEC	4	Q1,Q2,Q3,Q4
7	RNL 1/6 102 JT-52	1Kohm,5%,1/6W,AA,TP	HAN RYUK	5	R5,R6,R7,R8,R14
8	RNL 1/6 151 JT-52	150ohm,5%,1/6W,AA,TP	HAN RYUK	8	R19,R20,R21,R22,R23,R24,R25,R26
9	RNL 1/6 330 JT-52	33ohm,5%,1/6W,AA,TP	HAN RYUK	1	R27
10	RNL 1/6 331 JT-52	330ohm,5%,1/6W,AA,TP	HAN RYUK	2	R15,R28
11	KPT-1115A	12VDC,50mA,SPST	KYUNG IN	7	S1,S2,S3,S4,S5,S6,S7
12	74HCT374N	3-STATE Octal D-TYPE Flip-Flop,PDIP	TI,ST,LG	2	U1,U2
13	TSOP1238		TEMIC	1	U3
14	RSS-47/25-5*11*5	47uF/25V-5*11*5, FORMING CUT TYPE	SAMWHA	1	EC1
15	A-394G-L8(H3491,B/W)	FOUR DIGIT DISPLAY,5mm supporter 포함	PARA LIGHT	1	LED1
16	1N4001ID	GENERAL PURPOSE PLASTIC RECTIFIER, 5OV, -65~+175,SOD81	philps	7	D1,D2,D3,D4,D5,D6,D8

NO	PART NUMBER	DESCRIPTION	Vendor		
1	7mm,BLU		WARYONG	1	U3 SUPPORTER
2	5mm, BLU		WARYONG	2	LED2,LED3 SUPPORTER

7. Software download instructions(PC download)

7.1 Program Download



Firmware download

You can download firmware to receiver

- Press “BROWE” button to select firmware (hex) to downloading.
- After selecting firmware, you can start downloading by pressing “START” button.
- You can see progressing bar while downloading
- The receiver will automatically restart when downloading is finished.

Channel Information upload

You can save channel information of receiver to PC file by using this function

- You have to select a file to save in PC by pressing “BROWSE” button.
- Press “START” button to start uploading

Channel Information download

You can download channel information saved above to receiver

- You have to select a file to download to receiver by pressing “BROWSE” button.
- Press “START” button to start downloading

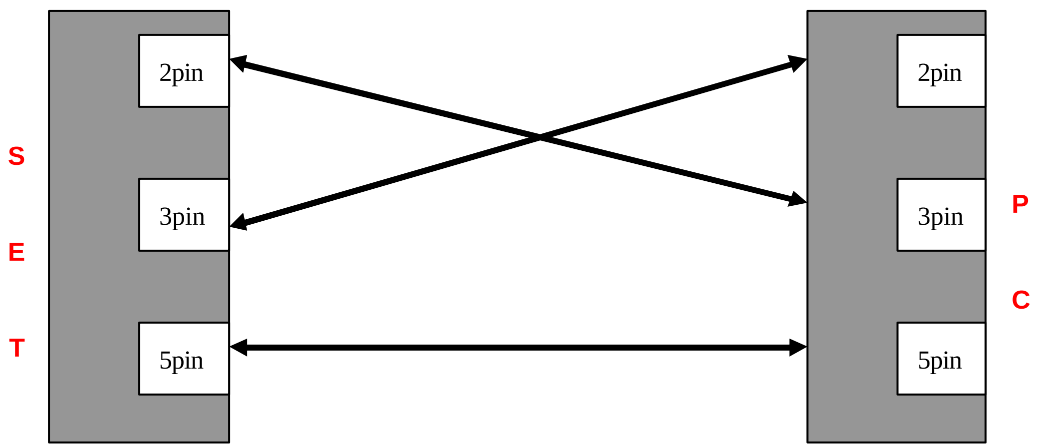
7.2 System Upgrade

If there is a new version of software available for your receiver, you are able to download it automatically via the satellite signal of HOTBIRD.

1. Please wait while your receiver is checking if your software version is the newest one available.
2. If you already have the newest version noting will happen, and you can leave the menu. When you need the newest version software, the receiver will automatically download that version from the satellite signal. After the download is finished, your screen will turn green for a few seconds while the receiver is re-booting.
   When the screen is back is to normal, you can leave the menu.

Tips : Do not turn off your receiver while you are downloading new software.
Be sure that your receiver is connected to the satellite signal of HOTBIRD.

8 Specification of required cables for software download



9PIN (E-MAIL) 9PIN (P-MAIL)

9 DATA SHEET

: APPEND